DOCUMENT RESUME

ED 149 671 HE 009 584

AUTHOR Bryan, John L.
TITLE National Fire Academy: A Study of the Relationship of the National Fire Academy to the Fire-Related Education Programs in Colleges and Universities.
INSTITUTION National Fire Prevention and Control Administration (DOC), Washington, D.C.
PUB DATE 28 Feb 77
CONTRACT DOC-7-34429
NOTE 145p.
AVAILABLE FROM National Fire Prevention and Control Administration, Department of Commerce, Washington, D.C.

EDRS PRICE MF-$0.83 HC-$7.35 Plus Postage.
DESCRIPTORS Accreditation (Institutions); Articulation (Program); *Curriculum Design; Educational Opportunities; Educational Planning; *Educational Programs; *Engineering Education; Enrollment; *Fire Fighters; Fire Protection; *Fire Science Education; Higher Education; *Paraprofessional Personnel; Professional Education; Secondary Education; Service Occupations; Trade and Industrial Education

ABSTRACT

In this research study the principal objective was to identify and analyze the recognized needs of the target audience within the fire services, along with the educational programs presently established within colleges and universities for the solution of fire-related problems. A second objective involved analyzing and evaluating the five-year educational plan of the National Academy for Fire Prevention and Control relative to existing fire-related education programs in colleges and universities. Critical problems in existing programs were also identified with possible solutions suggested. The educational programs included fire protection engineering and two- and four-year fire-related education. Audiences were identified as: pre-service population, fire service population, two-year fire-related education program graduate, fire protection engineering student population, related student population, and practicing professional population. Problem areas identified include: enrollment policies, incentives for education participation, college credit for experience, quality of the faculty, uniformity of programs and courses, articulation and accreditation, and graduate and student opportunity. Selected five-year plan objectives are presented and a bibliography is included. (LBH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED149671

HE

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

NATIONAL FIRE ACADEMY

A Study of the Relationship of the National Fire Academy to the Fire-Related Education Programs in Colleges and Universities

HE 009 584

U.S. DEPARTMENT OF COMMERCE
National Fire Prevention and Control Administration
National Academy for Fire Prevention and Control

This study represents the views of the author and not necessarily those of the National Fire Prevention and Control Administration.

Prepared for the
U.S. DEPARTMENT OF COMMERCE
National Fire Prevention
and Control Administration
National Fire Academy

February 28, 1977
(Contract No. 7-34429)

NATIONAL FIRE ACADEMY

A Study of the Relationship of the National Fire Academy to the Fire-Related Education Programs in Colleges and Universities

by Dr. John L. Bryan

EXECUTIVE SUMMARY

I. OBJECTIVES OF THE STUDY

The principal objective of the research study was to essentially identify and analyse the recognized needs of the target audiences within the fire services, and the educational programs presently established within colleges and universities for the solution of fire related problems.

A secondary objective of the study involved the analysis and evaluation of the five year plan of the National Academy for Fire Prevention and Control relative to the relationship of the projected objective results on the existing fire related education programs in the colleges and universities.

The final objective of the study was an attempt to identify the critical problems in the existing fire related education programs and to suggest possible functional solutions to the problems related to the National Academy for Fire Prevention and Control.

II. STUDY PROCEDURES

The study involved an analysis of the identified and recognized needs of the current fire service audiences relative to the educational programs presently established within colleges and universities. The various educational alternatives were studied relative to the published objectives of the educational programs to provide for the maximum utilization of resources and the optimum development of the identified audiences for an effective relationship with the National Academy for Fire Prevention and Control. Various existing and unique relationships

were examined relative to the supportive roles available for the National Academy for Fire Prevention and Control in its relationships to the existing educational programs. The converse alternative roles of the college and university educational programs were also studied relative to the National Academy for Fire Prevention and Control. The current problems of the existing college and university education programs as identified in the study were analyzed and examined.

The parameters of probable new or innovative programs which might be initiated by the colleges or universities were examined relative to the legislative established objectives and responsibilities of the National Academy for Fire Prevention and Control. This study involved an intensive examination and search of the literature to provide an understanding of the historical development and progression of the college and university educational programs. The examination and study of previous discontinued educational programs was attempted, but was of limited scope due to the difficulties in obtaining valid and reliable information.

The five year plan of the National Academy for Fire Prevention and Control as developed in draft form, was examined for the impact of alternative organization, educational, and administrative concepts relative to the types of relationships that might be established between the existing fire education programs in the colleges and the universities and the National Academy for Fire Prevention and Control. Suggestions and recommendations were included for modifications to the five year plan as a result of this study examination and analysis.

This study evaluated selected data and information concerned with

the existing fire related education programs as established in high schools, community and junior colleges, and colleges or universities. These programs were identified from both published and unpublished literature, with a primary source being the Report on a Survey of the Fire Education and Training Programs, as conducted by a consortium of fire service organizations. The five year plan of the National Academy for Fire Prevention and Control as examined in the study was in the preliminary draft form developed as of November, 1976.

The review of both published and unpublished literature in the course of the study resulted in a bibliography consisting of 131 items.

III. CONCLUSIONS

These conclusions contain suggestions for the procedures and philosophy of the National Academy for Fire Prevention and Control to foster the development of an enduring cooperative relationship with the existing fire related education programs in the colleges and universities.

It will be apparent these conclusions have emphasized the formulation of programs for the improvement and development of the faculty in the fire related education programs in the colleges and universities. It is sincerely believed the current and future problems in the fire related education programs will be most effectively and efficiently solved with the development of a high quality, dedicated faculty commensurate to the faculty required in all of the recognized professions.

1. The following principal problems were identified in the existing fire related education programs in the colleges and universities during this study, and were extensively examined in the study report. It is

recommended the policies and programs of the National Academy for Fire Prevention and Control be designed and directed toward the alleviation of these problems:

a. Restricted or closed enrollment policies.

b. Incentives for program participation.

c. Academic credit for experience.

d. Qualifications of faculty.

e. Uniformity of programs and courses.

f. Articulation and accreditation.

g. Graduate and student opportunity.

2. To achieve recognition as a profession, graudate education must be established in the fire related education programs in the colleges and universities. Program areas have been identified, and forest fire related graduate education programs have received both financial and personnel support. Graduate education provides the essential interchange and relationship between research innovation and the progression of the profession. A valid appreciation and understanding of the purpose, process, and limitations of research is essential to the improvement of public fire protection.

It is recommended the National Academy for Fire Prevention and Control provide financial support for the initiation of graduate fire related education programs in conjunction and cooperation with the Fire Safety and Research Office of the National Fire Prevention and Control Administration. Graduate education is an essential process for the improvement and development of the existing and future faculty in the fire related education programs.

3. The National Academy for Fire Prevention and Control should establish an "Academy Associate" program. The program would be designed to encourage and facilitate the interchange of faculty personnel between colleges and universities with fire related education programs and the National Academy for Fire Prevention and Control.

a. Faculty from colleges and universities would serve as visiting instructors at the National Academy for Fire Prevention and Control on a one or two semester basis.

b. Instructional personnel from the National Academy for Fire Prevention and Control would serve as visiting professors in the fire related education program at the colleges or universities.

4. The National Academy for Fire Prevention and Control should initiate "Visiting Professor" positions in the fire related education programs at selected colleges and universities. These positions would enable the interchange of faculty between colleges and universities, with the resulting education and improvement of the faculty.

5. A "Sabbatical Facilitation" program should be established by the National Academy for Fire Prevention and Control with both financial and personnel support. Most community colleges provide little or no opportunity for sabbatical leave to the faculty of the fire related education programs. Personnel support could be provided through the "Visiting Professor" program, or with the use of graduate students under the "National Fire Fellowships", as discussed in the study report. Faculty in fire related education programs would be considered eligible for this program with the following sabbatical goals:

a. Participation in the "Academy Associate" program.

b. Participation in the "Visiting Professor" program where mutual interchange of faculty can not be arranged. An example might be the initiation of new courses or a new program at an institution.

c. Participation in continued graduate study toward a graduate degree in a program designed to improve the professional capabilities of a faculty member in a fire related education program.

d. Participation in continued graduate study on a "National Fire Fellowship".

e. Participation as adjunct personnel to obtain professional experience designed to improve the professional capabilities of the faculty member in a fire related education program, including the following:

1. Fire research organization: Private or government fire research laboratories, including the Fire Research Center at the National Bureau of Standards, and the Fire Safety and Research Office of the National Fire Prevention and Control Administration.

2. Fire prevention organization: State or local fire marshal or fire prevention bureau, including the Public Education Office at the National Fire Prevention and Control Administration.

3. Fire department: Professionally staffed and administered fire department, including selected governmental agency or private industry departments.

6. An attitude of sincere commitment to cooperative endeavors and mutual professional respect must be developed between the National

Academy for Fire Prevention and Control and the fire related education programs in the colleges and universities. The National Academy for Fire Prevention and Control will have to earn the respect of the academic faculty with the establishment and maintenance of high standards of performance in their programs in the following manner:

a. Established demonstrated performance in an academic fire related education program should be a prerequisite for attendance in the residence courses at the National Academy for Fire Prevention and Control. Attendance or enrollment procedures established on the political considerations of rank, geographical area, and organizational memberships will reflect on the academic and professional integrity of the National Academy for Fire Prevention and Control.

b. Faculty of the National Academy for Fire Prevention and Control should be selected for demonstrated proficiency in academic performance including teaching, research, and professional competence. The present selection of personnel appears to indicate a strong bias toward the selection of fire department and fire service performance orientated individuals.

c. The established and respected procedures of academic integrity will have to be maintained in the National Academy for Fire Prevention and Control courses. The maintenance of these procedures is especially critical for the courses in which academic credit is to be obtained from colleges and universities through articulation agreements. Most critical in this respect will be the procedure adopted relative to the consideration of academic credit for experience.

d. The eventual evaluation of the quality, academic integrity, and the professional competence of the National Academy for Fire Prevention and Control courses and programs will be determined by the students and the graduates through their achievements and professional performance.

TABLE OF CONTENTS

Page

I. INTRODUCTION 1

II. LIMITATIONS OF THE STUDY 3

III. HISTORICAL ANALYSIS OF THE EDUCATIONAL PROGRAMS 5

A. Fire Protection Engineering 5
B. Two-Year Fire Related Education 7
C. Four-Year Fire Related Education 13

IV. THE IDENTIFICATION OF AUDIENCES 18

A. High School Program Population 19
B. Fire Protection Engineering Population 23

1. Graduate Programs 26
2. Fire Protection Engineer and Public Safety 30

C. The Design Professional Population 34
D. The Two-Year Fire Related Education Population 36

1. Two-Year Fire Technology Population 41

E. The Four-Year Fire Related Education Population 44
F. Identification of the Audiences 47

1. Pre-service Population 48
2. Fire Service Population 48
3. Two-Year Fire Related Education Program Graduate 49
4. Fire Protection Engineering Student Population 49
5. Related Student Populations 50
6. Practicing Professional Population 51

G. Populations Not Identified With Existing Programs 52

V. THE NATIONAL ACADEMY FOR FIRE PREVENTION AND CONTROL 57

A. Recommended Roles and Programs 57
B. Legislative Mandate Responsibilities 63
C. Five-Year Plan Drafts - National Academy 66

VI. IDENTIFIED PROBLEM AREAS WITH EXISTING PROGRAMS 72

A. Enrollment Policies 73
B. Incentives for Education Participation 75
C. College Credit for Experience 78

Page

D. Quality of the Faculty 82
E. Uniformity of Programs and Courses 84
F. Articulation and Accreditation 91
G. Graduate and Student Opportunity 100

VII. SUGGESTIONS AND RECOMMENDATIONS 106

A. Selected Five Year Plan Objectives 108

VIII. CONCLUSIONS 116

IX. BIBLIOGRAPHY 122

LIST OF TABLES

Table | Title

I. Distribution and Number of Two-Year Fire Related Education Programs in the United States, 1971 10

II. Distribution and Number of Two-Year Fire Related Education Programs in the United States, 1975 12

III. Fire Related Baccalaureate Degree Programs 46

IV. Identified Student Populations - Audiences Served by Existing Academic Fire Related Education Programs 53

I. INTRODUCTION

The original impetus and interest in this study was generated through conversations with Dr. Herman Weisman and Mr. Anthony R. Granito of the National Academy for Fire Prevention and Control. A proposal was then submitted to the National Fire Prevention and Control Administration of the Department of Commerce on May 25, 1976. A contract was awarded on the proposal by the Materials and Services Contracts Division of the Department of Commerce with an effective date of November 2, 1976. Dr. Herman Weisman of the National Academy for Fire Prevention and Control, National Fire Prevention and Control Administration, was designated as the Contracting Officer's Technical Representative for the project.

The National Academy for Fire Prevention and Control Five Year Plan documents in draft form, (83) the Statistical Analysis of the Survey of the Fire Education and Training Program Within the United States and Its Territorial Possessions, (75) the Region 11 Fire Service Education Needs Analysis Project Report, (9) and the report of the Region 10 Fire Service Education - Needs Analysis Seminar, (92) were all provided by the National Academy for Fire Prevention and Control. One preliminary orientation meeting was conducted with the Contracting Officer's Technical Representative at the initiation of the project.

The study involved an analysis of the identified and recognized needs of the current fire service audiences relative to the educational programs presently established within colleges and universities. The various educational alternatives were studied relative to the published

objectives of the educational programs to provide for the maximum utilization of resources and the optimum development of the identified audiences for an effective relationship with the National Academy for Fire Prevention and Control. Various existing and unique relationships were examined relative to the supportive roles available for the National Academy for Fire Prevention and Control in its relationships to the existing educational programs. The converse alternative roles of the college and university educational programs were also studied relative to the National Academy for Fire Prevention and Control. The current problems of the existing college and university education programs as identified in the study were analyzed and examined.

The parameters of probable new or innovative programs which might be initiated by the colleges or universities were examined relative to the legislative established objectives and responsibilities of the National Academy for Fire Prevention and Control. This study involved an intensive examination and search of the literature to provide an understanding of the historical development and progression of the college and university educational programs. The examination and study of previous discontinued educational programs was attempted, but was of limited scope due to the difficulties in obtaining valid and reliable information. The five year plan of the National Academy for Fire Prevention and Control as developed in draft form, was examined for the impact of alternative organization, educational, and administrative concepts relative to the types of relationships that might be established between the existing fire education programs in the colleges and the

universities and the National Academy for Fire Prevention and Control. Suggestions and recommendations have been included for modifications to the five year plan in Section VII of this report as a result of this study examination and analysis.

The study also consisted of a comprehensive examination of the existing fire related educational programs currently established in high schools, community and junior colleges, and four year colleges and universities.

II. LIMITATIONS OF THE STUDY

This study evaluated selected data and information concerned with the existing fire related education programs as established in high schools, community and junior colleges, and colleges or universities. These programs were identified from both published and unpublished literature, with a primary source being the Report on a Survey of the Fire Education and Training Programs, as conducted by a consortium of fire service organizations. (58) The five year plan of the National Academy for Fire Prevention and Control as examined in the study was in the preliminary draft form being developed as of November, 1976. (83)

The evaluation and analysis of the objectives of the National Academy for Fire Prevention and Control was limited to the draft form of the five year plan of November 1, 1976 and the legislative objectives in the Fire Prevention and Control Act. (101) This study was limited by the examination of the identified and selected data available on the college and university fire related education

programs at either colleges or universities. However, the summaries and reports of various educational observers and personnel relative to the educational procedures and problems involved in the college and university programs since 1965 were studied and reviewed. The papers presented at the Symposium on Higher Education for the Fire Service conducted by the Division of Fire Safety, State of New York, (36); the seminar and workshops conducted by the Applied Physics Laboratory of Johns Hopkins University, consisting of the Problems in Teaching the Fire Sciences, (120) in 1973, and the Teaching of the Fire Sciences, (121) in 1974, were utilized extensively as resource documents.

It is recognized and acknowledged this study of the relationships between the fire related education programs in the colleges and universities and the National Academy for Fire Prevention and Control was subjected to the educational, psychological, social, and professional experience biases of a single individual. In addition, it is recognized many of the variables or program factors mentioned in this report may already be under consideration for implementation or modification by the National Academy for Fire Prevention and Control.

This study also assumed the physical facilities and the design of the educational programs of the National Academy for Fire Prevention and Control would probably be in general conformance with the site selection criteria, (85) for the Academy and identified as program options I through IV.[1]

---

[1] National Fire Prevention and Control Administration, Report of the National Academy for Fire Prevention and Control, Site Selection Board. Washington, D.C.: Department of Commerce, 1976, p. 11-13.

III. HISTORICAL ANALYSIS OF THE EDUCATIONAL PROGRAMS

A. Fire Protection Engineering Programs

Fire related education programs at colleges or universities in the United States were initiated with the establishment of the four year baccalaureate degree program in fire protection engineering in 1903 at the Armour Institute of Technology in Chicago, Illinois. This educational program presently continues to be very active at the Illinois Institute of Technology. This education program was actively supported from 1920 until 1973 by the capital stock insurance industry of the United States with an extensive student aid and scholarship program. This student aid program supported the total financial costs of the student for four years, and required the student to work three summers, and three years following graduation with one of the insurance rating bureaus, (now Insurance Services Offices) in the midwestern portion of the United States.

The initiation of this active and continuing student aid program at the Illinois Institute of Technology appeared to have been a direct result of the then current fire problems of the insurance industry, as evidenced by the severe urban conflagrations which were prevalent in the United States during the early twentieth century. The development and growth of the concept of fire protection engineering has been slow and tedious since 1903, with the only additional program having been established at the University of Maryland in 1957. The primary initial support for the establishment of this educational program

at the University of Maryland was a successful extension, in-service educational program for paid and volunteer fire department personnel, with the resulting interest and support of the state legislature to provide funding for the program.

The fire protection engineering program at the University of Maryland received financial support from the capital stock insurance companies, with a scholarship and student aid program for ten years from 1958 until 1967, with the last capital stock insurance scholarship student graduating from the University of Maryland in May of 1972. Currently, there are many fire protection engineers in the insurance companies, the insurance engineering service organizations such as the Insured Risk Insurers, the Factory Mutual Engineering Division, and the Insurance Services Offices, who are products of the scholarship and student aid plans of the insurance industry at the Illinois Institute of Technology or the University of Maryland.

At the present time, both the University of Maryland and the Illinois Institute of Technology receive funds for academic scholarships from the Factory Mutual system. These scholarship programs are similar to most endowed scholarships with no temporary or term employment obligations for the summers or following graduation. Additionally, both of these programs have fire protection engineering student aid and scholarship funds provided by related segments of the insurance industry on a limited basis, primarily from small independent companies, and brokerage concerns.

B. Two-Year Fire Related Education Programs

The first educational program specifically developed to meet a demand for educational opportunities of an academic type from the fire service was the initiation of a two-year certificate program in Fire Protection at Oklahoma A & M College in 1937. This program progressed to an Associate Degree program about 1952, as the expected educational progression from the two-year certificate program. This program has been a continuing program, and was reorganized and expanded in 1972 into a four-year technology program offering a baccalaureate degree in fire protection and safety technology.

However, primarily due to the occurrence of World War II, there were no significant developments in the two-year fire related education programs during late 1930's and early 1940's. Following World War II, with the increased educational benefits to veterans, two-year fire related education programs were established on a limited scale in California with the programs initiated in 1949 at Contra Costa Community College and East Los Angeles Community College. The community and junior college development in the United States was however, still primarily limited to California and the West Coast, with the fire service not extensively interested in academic development through the two-year fire related education programs. The primary and extensive development of the two-year programs designed for the fire service began in the early 1960's. The establishment of the two-year associate degree program in fire protection technology at the Rowan Technical Institute in Salisbury, North Carolina in 1964 was

the initial two-year technological fire related education program on the East Coast.

The growth of the two-year fire science and technology programs became increasingly active when fire department personnel with the assistance of the International Association of Fire Fighters began to urge the establishment of the two-year fire science educational programs upon the established and developing community and junior colleges. Favreau, (43) in his original survey of the fire science programs in 1966 reported a total of eleven states with twenty-one, two year programs. Upon examination of this report, it is interesting to note that ten of the twenty-one, two-year programs were established in the State of California.

Favreau, (44) also conducted a follow-up survey on the fire science programs in 1968, which indicated a total of sixty-one, two-year programs established in eighteen states. Again, in this survey California reported the most extensive activity with a total of thirty-two programs. It should be remembered that California has been very active in the development and initiation of community and junior colleges throughout the state. Thus, the fire service personnel in California appeared to be more interested in the two-year fire related education programs. Other states having multiple programs reported by Favreau in 1968 were New York with seven programs, North Carolina with two programs, Oregon with two programs, Washington with four programs, and the State of Wisconsin with two programs. However, if the four-year Fire Protection Engineering programs are included,

Maryland and Illinois would also have two programs in 1968.

Favreau's final study in 1971, (45) indicated a total of 135 two-year fire related education programs were actively established in thirty-one states. As in the previous studies, the State of California had the greatest number of fire related educational programs with a total of fifty-one programs. Relative to the California programs, nine of these programs were established in the 1950's, forty-one of the programs were established in the sixties, and one program was established in 1949. This earliest continuous two-year program established in California was initiated at the East Los Angeles Community College in Los Angeles, California in 1949. A total of twenty-two of the thirty-one states with related educational programs as reported by Favreau in 1971 had multiple programs established as follows: Alabama, Pennsylvania, and Arizona with two programs, California with fifty-one programs, Florida with four programs, Illinois with six programs, Maryland with three programs, Massachusetts with ten programs, Michigan with five programs, Missouri with two programs, Nevada with two programs, New York with nine programs, North Carolina with two programs, Ohio with three programs, Oregon with three programs, Texas, Washington, Colorado and Connecticut with four programs, and Wisconsin and Virginia with two programs. The states with the number of established two-year fire related education programs within the states as established in 1971 are presented in Table I on page 10 of this report.

Thus, it would appear upon an examination of the initiation dates for the two-year fire related education programs, as documented

TABLE I

DISTRIBUTION AND NUMBER OF TWO-YEAR FIRE RELATED EDUCATION PROGRAMS IN THE UNITED STATES - 1971*

State	Number of Programs
California	51
Massachusetts	10
New York	9
Illinois	6
Michigan	5
Colorado	4
Connecticut	4
Florida	4
Texas	4
Washington	4
Maryland	3
Ohio	3
Oregon	3
Alabama	2
Arizona	2
Missouri	2
Nevada	2
North Carolina	2
Pennsylvania	2
Wisconsin	2
Alaska	1
Delaware	1
Hawaii	1
Indiana	1
Maine	1
Minnesota	1
Mississippi	1
New Jersey	1
Oklahoma	1
Rhode Island	1
Virginia	1
Total 31	135

*Donald F. Favreau, Fire Service Education, 1971, A Survey and Historical Developments of Fire Service Education in the United States. Albany: International Fire Administration Institute, State University of New York at Albany, 1971, p. 35.

in Favreau's three reports, (43), (44), (45) that a growth surge for the establishing of two-year fire related education programs occurred during the latter half of the decade from 1960 to 1970. The examination of the Consortium study conducted for the National Fire Academy for Fire Prevention and Control in 1975, (58) indicated a total of 223 two-year fire related education programs offering associate degrees, an increase nationally of eighty-two established programs since Favreau's 1971 study. However, it should not necessarily be assumed these eighty-two programs were initially established between 1971 and 1975, since some of these programs may have been established earlier though initially reported in the national survey. These 223 two-year fire related education programs were reported to be established in forty-four states, with the six states of Idaho, Montana, North Dakota, South Dakota, Vermont and Wyoming, reporting no academic fire related education programs within their states in 1975. The 223 two-year programs in the various states are presented in Table II on page 12 of this report and should be compared with the distribution for 1971 in Table I on page 10. It should be noted that thirty-four states had multiple programs within the state, and ten states were limited to a single fire related academic educational program in 1975.

The consortium report, (58) also indicated a total of NINETEEN baccalaureate degree, fire related academic programs of the technology, management, and engineering types. Two masters degree programs in forest fire related areas were also included in the report. This report also indicated a total of 40,916 students were enrolled in the academic fire related programs in 1975. Favreau, (45) reported in his 1971 study a

TABLE II

DISTRIBUTION AND NUMBER OF TWO-YEAR FIRE RELATED EDUCATION PROGRAMS IN THE UNITED STATES - 1975**

State	Number of Programs
California	44
Illinois	18
Florida	17
Arizona	14
Texas	14
Massachusetts	11
North Carolina	11
Ohio	7
New York	7
Kentucky	6
New Jersey	6
Wisconsin	6
Michigan	5
Pennsylvania	5
Washington	5
Maryland	4
Colorado	3
Nebraska	3
Nevada	3
Oregon	3
Alabama	2
Connecticut	2
Delaware	2
Hawaii	2
Indiana	2
Iowa	2
Missouri	2
Oklahoma	2
Rhode Island	2
Tennessee	2
Virginia	2
Alaska	1
Georgia	1
Maine	1
Minnesota	1
Mississippi	1
New Hampshire	1
New Mexico	1
South Carolina	1
Utah	1
Total 40	223

**International Association of Fire Chiefs, The International Association of Fire Fighters, The International Society of Fire Service Instructors, The National Fire Protection Association, Report on a Survey of the Fire Education and Training Programs, 1975, p. 8-1.

total enrollment for the fall semester of 1971 consisting of 13,700 students in fire related academic education programs. Kimball, (65) reported that 8,875 members of 501 fire departments were enrolled in academic programs of study in fire related courses leading to baccalaureate and associated degrees in 1967.

Thus, it would appear the two-year program of academic courses in fire science, fire technology, fire administration or management has been generally accepted by the fire service personnel throughout the United States as the initial program of academic study. The primary institution of higher education concerned with the development of this fire related education program has been the local or county community college, even though the initial program of this type was established in 1937 in a four year institution, Oklahoma A & M College, now Oklahoma State University. The growth of the two-year fire science programs have paralleled the growth and development of the community and junior college institutions, and the growth of these institutions from the west coast throughout the United States.

C. Four-Year Fire Related Education Programs

One of the initial four-year fire related education programs was the program instituted at the University of Southern California in 1948 offering a baccalaureate degree in Public Administration with a major area of concentration in Fire Administration. This program was a very successful course for a number of years, since the program also offered both a Masters and a Doctorate Degree in Public Administration, with the

Fire Administration concentration. The program was discontinued in the period of 1969 - 1970 for the baccalaureate and the masters degree, while the doctorate program was continued for a few additional years.

Another early fire administration program was the program initiated with the members of the New York City Fire Department at the City College in Manhattan in 1939. However, with the initiation of World War II, this education program was discontinued. The Manhattan College program was both an in-service program and a program for the pre-service education of personnel desiring to enter the police, fire or sanitation departments of the City of New York. Carroll, (26) reported the pre-service program required a total of 64 credits in communications, science, humanities, and mathematics. The next program initiated with the New York City Fire Department was at the Queens College in 1955. This program was in the school of general studies, and was initially designed as a two-year program leading to the applied science degree. Carroll reported the following courses were an essential portion of the Queens College program:[2]

> This program combined a wide variety of liberal arts courses with some specialized fire courses. Some of the special courses were: Level Aspect of Fire Prospects, Fundamentals of Fire Administration, Fire Service Math and Physics, Building Construction and Fire Hazards, Fire Prevention and Inspection, and Safety in Industry and the Fire Service.

---

[2]Joseph J. Carroll and Sylvan P. Stern, "Community College, City of New York, Program," Proceedings of the Symposium on Higher Education for the Fire Service. Albany: Division of Fire Safety, State of New York, 1967, p. 229.

The current program established with the New York City Fire Department personnel involved the establishment of a two-year program in Fire Science Technology at the New York City College in Brooklyn. The program presently offers an Associate in Applied Science Degree, upon the completion of a total of seventy semester credit hours. This program has been very successful in New York City at the present time, and was initiated with the beginning of the fall semester in 1965. This program has been most popular and was designed to be the initial component of a fire related education program that would provide an opportunity for the student to continue into a four-year college of the New York City College system, and if desired, to obtain graduate credits in the New York City College System under a Masters Degree in Public Administration.

Carroll, (25) has indicated the previous limited and generally unfavorable experience of the New York City Fire Department with the fire related education programs at the Manhattan and Queens College, resulted in this design of the program, with an initial two-year program and the options for continuing within the New York City College system. O'Hagan, (95) has indicated the transfer program leading to the baccalaureate degree was initiated at the John Jay College of Criminal Justice in 1968 with the option to continue for either the Masters or the Doctorate degree in Public Administration.

The University of New Haven in 1970 examined the educational situation relative to the existing course offerings in the fire related education programs, and then initiated two baccalaureate degree programs, one with a major emphasis in Fire Science Administration and one with a

Fire Science Technology emphasis. These four-year programs have provided a popular option for graduates of the two-year fire related education programs to obtain a baccalaureate degree, concerned with either the technical or administrative aspects of fire science.

Thus, it appears the initial academic education program in the discipline and study of fire protection was a direct development of the intense and severe urban problem caused by multiple building conflagrations which were extremely prevalent in the cities of the United States in the decade from 1900 to 1910. This initial education program in Fire Protection Engineering had very little appeal to the general college student and was not designed or developed to provide an opportunity of higher education for fire department personnel. However, this program was the beginning of the total concept of fire related academic education programs. The development of the two-year fire related education program was pioneered in 1937 at Oklahoma State University. However, this type of education program was philosophically, educationally, and administratively suited for the junior and community colleges, and did not develop intensively until these colleges were generally established throughout the United States in the late 1950s and early 1960s.

Thus, the decade of 1960 to 1970 saw the greatest growth and development in the two-year fire related education programs, as these programs were developed in the community colleges. These education programs were primarily of a general nature, with the majority of the programs having the inclusive title of "Fire Science". The

development of these programs, coincided with the development of the community college system in the United States, and the development of motivational interest in higher education by the members of many fire departments. This intense interest in academic education by fire department personnel was developed and encouraged by the labor organizations, primarily the International Association of Fire Fighters. Additional factors aiding this interest were the educational benefits available from the Veterans Administration, and the recognition of the increased professional status and personnel benefits obtained by members of police departments with their participation and completion of academic education programs in colleges and universities.

It would presently appear the period of the most intense development and growth of the four-year fire related education programs is to occur in the immediate future. The initial and pioneering program at the University of Southern California, has been primarily replaced by the state developed and assisted program at the California State University at Los Angeles. The desire and motivation of the graduates of the two-year fire related education programs for a baccalaureate degree in a fire related program has resulted in the initiation of several baccalaureate programs. Some of these programs developed in the early 1970's include the University of New Haven, the California State University at Los Angeles, the adding of a baccalaureate program at Oklahoma State University and the program in Urban Studies - Fire Science at the University of Maryland.

The development of the Urban Studies - Fire Science program at the University of Maryland was in direct response to the need to develop

a fire related education program that would provide a continuing and articulated program of studies for the graduate of the two-year fire related education program. The program was designed and initiated with the cooperation of the coordinators of the fire science programs in the community colleges in the State of Maryland in 1974 and 1975. Thus, the program was intentionally designed to offer only the last two years of a four-year baccalaureate degree program. The student must obtain his initial two years of study in a community college in a fire related education program. Thus, the experience and design of the New York City programs with the initial program in the two-year fire related education program at Brooklyn Community College, with an articulated continuing program at the John Jay College of Criminal Justice was followed at the University of Maryland.

It would appear the next decade, based on the growth trends and patterns shown in the past, should see the development of additional four year baccalaureate degree programs designed to provide an articulated program for the two year fire related education program graduate.

IV. THE IDENTIFICATION OF AUDIENCES RELATIVE TO PROGRAMS

The audiences currently served by the existing fire related education programs will be examined relative to the educational programs that were identified in section III of this report: The fire protection engineering programs; the two-year fire related education programs; and the four-year fire related education programs. However, relative to student populations, an additional program will be considered, since

there are several active programs for high school students, which have been explained by Gilman, (54) Verburg, (123) Cline, (31) and Corn, (33). We will, therefore, initiate our consideration of the student audiences and populations with the high school program populations.

A. The High School Fire Related Education Program Population

The high school fire science programs appear to have been initiated as an aspect of the fire prevention program of the fire department in a community, or as a means to increase the recruitment activities for volunteer or professional fire department personnel. Considering the four programs described in the published literature, two of the programs, the one in Jersey City, New Jersey, (31) and the one in Orange County, California, (123) were developed for recruitment purposes. Both of these programs were developed in conjunction with the vocational and industrial education programs in the high schools.

The program in Jersey City was the only high school program reported to involve a community college fire science program, since the students are enrolled in an "Introduction to Fire Science" program at the Jersey City State College. This program was initiated in 1975 and is presently limited to thirty senior students in the one year long program. This program is supplemented with guest faculty, from some of the insurance and industrial organizations involved in private fire protection. Cline, (31) has indicated this course for high school seniors was divided into the following three phases

of instruction:[3]

(1) Classroom instruction at the individual high school
(2) Practical training at the Jersey City Fire Academy, and
(3) "Introduction to Fire Science" course at Jersey City State College.

The program in Orange County, California, (123) is designed for both the eleventh and twelfth grade students in high school, while it will be remembered the Jersey City program was restricted to the twelfth grade students. This program was initiated in 1972, and has been presented with the cooperation of the school district in three high schools in the county. The class is coeducational with the program being coordinated through the regional occupational program in the school system. The educational curriculum is highly skill orientated, being patterned after the fire department recruit school program. The educational program reportedly consists of ten hours a week, consisting of both classroom sessions and training ground skill evolutions. This high school program allows the successful students to enter the Orange California Fire Department at the entrance age of 18 with the benefit of a thorough introduction due to the successful completion of the basic recruit program and the advanced first aid training.

The third high school program reported in the literature involved a program in Wichita, Kansas, (33) involving the explorer scouts, and the Wichita Fire Department. The objective of this program was essentially the same as the Jersey City and the Orange County programs, which also

---

[3]James Cline, "N.J. High School Seniors Prepare for Fire Service," Fire Engineering, CXXIX, 9, (September, 1976), p. 80.

involved the pre-entrance orientation and recruitment of personnel for the fire department. Similar to the Orange County program, the Wichita program is coeducational, and has been in operation since 1972. Corn, (33) reported the basic value of this program has been to generate interest in the Fire Service.

It would appear that high school programs have been initiated primarily as a skill oriented pre-service educational type of program. These programs would also appear to have additional value as fire prevention education mechanisms, as developed in the Wichita program, (33) where the Explorer Scouts conduct an active fire prevention education program within the community. The only high school Fire Science program which appears to be actively coordinated with the fire related academic education program in a community college is the Jersey City program. (123) In the Jersey City program, the high school seniors were actually enrolled in, and fully participate in, the introductory course in this four year fire science program.

The initiation of high school fire science programs have primarily been the result of the initiative and interest of the local fire department in cooperation with the school system in the community. Given the current interest in many school systems with career education, it would appear to be reasonable to expect a number of high school programs to be initiated during the forthcoming five to ten years. This increased school system and community interest in career education in the high schools would appear to be a unique opportunity for the fire departments to develop and initiate these high school fire science programs to educate students as to both the professional and educational opportunities

available in the fire service. It appeared the high school programs developed with a fire prevention orientation concerned with the fire problem in residential occupancies would be highly educational, and acceptable to the high school population. The interest in these existing programs, and the reported interest in the crime prevention programs currently being offered in the high schools of some educational systems tend to indicate the high school population will support these programs.

Thus, there is a very large high school population consisting of both men and women which could be provided with current fire prevention, fire protection, and career orientation information relative to the fire service. It would seem to be most efficient and effective if the community college fire related education program personnel, both faculty and students, cooperated with the fire departments and the school systems in the local community to provide this type of educational program. It would appear there is a vast audience of high school seniors which constitutes a student population which has not been previously adequately addressed in relation to the objectives of residential life safety, the development of fire prevention behavior, and an understanding of the fire department's services. With information and data from the educational programs which have apparently been successful, such as in Orange County, (123) and Jersey City, (31) the development of high school fire science programs in cooperation with the career education programs in the high schools would appear to fulfill an essential professional need for the fire service, an educational need for the high schools, and a service need of the community.

The high school fire science program appears to be more viable and to have the greatest academic substance when it is organized in coordination and cooperation with the two or four-year fire related education program in a college or university as accomplished in Jersey City, (31). These programs could also be articulated with an apprentice training program in the fire department, or a cadet fire department personnel program where these types of early entry programs are available. The coordination of the high school fire science programs with the college fire related education program should result in a continued interest in fire protection as a career goal, and more importantly, interest in the college or university fire related education program as a continuing educational objective.

B. The Fire Protection Engineering Student Population

The two fire protection engineering programs in the United States presently graduate a combined total of approximately twenty to twenty-five engineers per year, resulting in an extremely high demand for the fire protection engineering graduates. Bond, (17) reported over fifteen years ago in 1960 on his survey which indicated an annual demand for two hundred fire protection engineers per year. Jensen, (62) in 1973 indicated an annual demand rate for fire protection engineers of 1,000 per year for the next ten years. When one considers the present membership of the Society of Fire Protection Engineers to be slightly above the membership of 1,871 reported in 1975, there would still appear to be an active demand for graduates of the fire protection engineering programs. Thus, it would appear many of the reported

fire protection engineering positions are not presently being satisfied or are being utilized with other engineering discipline graduates, or with technology graduates. There is some indication that technology graduates from four-year fire related technology programs have satisfied many of these positions. Graduates of the traditional engineering disciplines have usually entered the fire protection engineering area when employment opportunities in their traditional areas have been limited due to economic influences.

Considering the current limited output of graduates and the geographical location of the existing fire protection engineering programs in the United States, located at the Illinois Institute of Technology, and the University of Maryland, at least three additional fire protection engineering programs would appear to be desirable. These programs could be located in the Southeast, the Southwest, and on the West Coast. The 1976-77 student population at the University of Maryland in fire protection engineering consisted primarily of students from the State of Maryland and the Northeast portion of the United States. However, students were in attendance from Texas, California, Alaska, Washington, Florida, Virginia and Ohio.

The fire protection engineering programs presently appear to be primarily serving a preprofessional population of students of the typical undergraduate college age, with an inherent interest in the physical sciences or engineering. However, the experience of the University of Maryland program indicates the majority of the students also have an inherent interest in fire protection from related or active participation

in the fire service, primarily in volunteer fire departments. It would thus appear, even the fire protection engineering programs are providing an educational opportunity to a restricted, highly limited population from the fire service.

Additionally, the experience of the University of Maryland program over the most recent five or six years, since 1970, has indicated the majority of students, usually approximately sixty-six per cent of the initial enrollments in the academic year, are transfer students from community colleges, four-year colleges, or universities. In addition, approximately 15 per cent of the initial enrollments in the academic year will consist of students that already possess a baccalaureate degree. There have also been four students over the past five years with graduate degrees, and these students have entered the program to obtain a fire protection engineering baccalaureate degree. All of these students have primarily been enrolled on a full-time basis, although every semester there are two or three students with previous degrees enrolled on a part-time basis, often with the attendance in the program subsidized by their employer. Generally, these students have received their initial baccalaureate degrees in the traditional engineering areas, or the physical sciences. Most of the post baccalaureate degree students are attracted to fire protection engineering due to their present employment responsibilities or by the need for re-education into an area with greater career opportunities. It would appear the fire protection engineering programs are currently primarily serving the full-time preprofessional student population, and the graduates seeking

a new career orientation, with an engineering or physical science baccalaureate education.

Due to this continuing persistent population of professionally educated personnel enrolling in one of the existing undergraduate fire protection engineering programs, it would appear that a graduate program would recieve substantial and adequate student support. Such a graduate program designed for the part-time student should receive considerable student enrollment from the building and design related professions consisting primarily of the architects, civil, mechanical, electrical, chemical, and industrial engineers.

1. Graduate Programs

The only existing graduate program in fire protection engineering for a masters degree was initiated with the fall semester in 1975 at the University of Edinburgh, Scotland under Professor Rasbash, (106). This program involves a full calendar year of study for a masters degree in "Fire Engineering". The program currently appears to be well established, with the four initial students completing their degrees in 1976. The Illinois Institute of Technology offered a Master's Degree program from the early 1930's until the program was discontinued after approximately ten years, during World War II. Reportedly a number of Master of Science Degrees were earned under this program.

The University of California, Berkeley, has awarded one Ph.D. Degree in Fire Protection Engineering under the Civil Engineering Department in 1976. This new program appears to be an option in the

doctorate program and provides the student an opportunity to conduct his diasertation research in the Fire Research program at the University.

The consortium study, (58) identified two graduate programs leading to a masters degree in a fire related educational program. Both of these programs were related to the forest fire problem with two masters and one doctorate degree being offered through the university forestry programs of education, research, and study at both Humboldt State University in California, and the University of Washington, Seattle.

Murphy, (82) has indicated a cooperative education program has been offered between the College of Forest Resources, the University of Washington, Seattle, and the United States Forest Service since 1967. The objectives of this masters and doctorate program as related by Murphy involves the following objectives:[4]

(1) Develop graduate programs in forest fire science and technology
(2) Train forest fire scientists
(3) Conduct cooperative forest fire research

This graduate education program at the University of Washington was designed to result in two masters degrees and a Doctor of Philosophy degree. One masters degree is a professional degree designed to educate the forest fire manager culminating in the Master of Forest Resources degree. The Master of Science and Doctor of Philosophy degrees are highly specialized programs of study with flexible entrance requirements, being designed to educate the forest fire researcher. These graduate programs at the University of Washington assume a baccalaureate degree

---

[4]James L. Murphy, Forest Fire Sciences Graduate Studies. Vancover: Western Forest Fire Coordinating Committee, December 1, 1970, p. 2.

in forestry but will allow the entrance of most qualified students from the physical, biological, and social sciences. Thus, interdisciplinary study programs are encouraged and previous study areas have involved the sociology of fire prevention, the chemistry and physics of fire behavior, and the cost effectiveness of fire control systems. The flexibility of graduate education as contrasted to undergraduate programs in most colleges and universities in the United States is adequately demonstrated in these forest fire related graduate education programs at the University of Washington. Murphy indicates that seventy per cent of the graduate students in this educational program have been under some agency or company training program.

The cooperative type of graduate education program as established at the University of Washington, with economic and personnel support from the United States Forest Service would appear to be an effective model for the stimulation of graduate eduation programs in fire protection engineering in the United States. The flexibility of the graduate programs and the primary design of the graduate program to serve the professional within the profession is adequately illustrated in these University of Washington graduate degree programs.

It would appear the audiences not being adequately served by the existing undergraduate fire protection engineering programs would consist of the fire protection engineering professional, and the building or design professionals with the primary undergraduate academic education preparation in architecture, or the traditional engineering areas of electrical, chemical, industrial, mechanical, and civil engineering. Continuing education conducted on a seminar, symposium, institute, or

short course format has recently been initiated by some of the professional organizations, most specifically the National Fire Protection Association and the American Society of Heating and Air Conditioning Engineers. However, these educational programs have been very restrictive in the scope and length of time of the course offering. These programs have also been primarily designed to impart very specific data and information for a very strictly defined problem area. What presently seems to be missing relative to the Fire Protection Engineering professional continuing education is the multiple meeting, semester length course with the time for detailed study, analysis, and examination. It would appear graduate education programs in fire protection engineering, designed and administered for the practicing profession would be efficient, effective, and productive.

The initiation of graduate programs in fire protection engineering should enhance the fire research programs and studies involved in the analysis and examination of the urban fire problems, related to the technical and physical sciences. Such graduate programs would allow more opportunities for interdisciplinary programs and study, at the graduate level and would thus provide for the detailed research study of long recognized and neglected fire protection problems. Problems such as the effectiveness of urban fire prevention programs; the behavior of individuals in decision situations; environmental or equipment aids for the determination of escape routes in buildings; the variables influencing the individuals selection or effective use of fire control and suppression equipment, have not been thoroughly researched.

The areas which have been neglected appear to be due to the interdisciplinary nature of the problem which involve the sociological and psychological environment of the individual, the physical environment of the structure, and the physical-chemical environment of the fire occurrence.

The professional occupations most severely isolated from the fire protection engineering education principles would be the urban planners, the interior designers, the architects, and the engineering educated building design and construction professionals. It would appear these professional design personnel could be most effectively served with part-time graduate fire protection engineering programs. The programs should be designed and orientated toward the Master of Science or Master of Engineering Degree, and administratively designed for the part-time professional student. Educational innovations such as television programming, (127) case studies, (47) (124), and off campus teaching would appear ideal for this type of program.

1. The Fire Protection Engineer and Public Safety

One relatively new area of endeavor for the fire protection engineer involves the interpretation of public safety involved with fire prevention bureaus, fire marshal's offices, and building departments. At the University of Maryland, the first graduate in public safety was utilized by a county building department in 1966. In the subsequent decade, five graduates have been hired in a state fire marshal's office, and five graduates have been hired in four fire departments: Prince Georges County, Maryland; Alexandria, Virginia; Fairfax County,

Virginia; and Phoenix, Arizona. The fire protection engineer would appear to be in a unique position to improve the fire protection of a community very substantially if utilized in the fire prevention bureau or the building department, in consultation with the interior designers, builders, urban planners, and the architects to educate them concerning the rationale and the philosophy of the requirements relative to fire and life safety procedures.

In addition, Everard, (41) indicated one of the principal advantages of the fire protection engineer in the fire department involved his ability to serve as a technical adviser to the principal executive in the department. Thus, the fire protection engineer could present technical data and information on a problem independent of the subordinate chief officers representing the empirical aspect of the problem. Presently, the use of fire protection engineers in the investigation of urban fire problem solutions by local and state governments is developing rather slowly. The cities of Los Angeles, San Jose, San Francisco, Dayton, Seattle, Durham, and Greensboro are examples of local governments which have attempted to obtain the services of a fire protection engineer within the past five years. It is known that several of these cities were unable to fulfill their requirements due to the limited number of graduates from the two existing programs in the United States.

Christian, (28) has indicated rather explicitly the value of the fire protection engineer as an interpreter of the fire research results and findings into the particular problem areas involving buildings, and the protection of buildings in the following

manner:[5]

> The traditional approach in the build-up of any technology has been that the scientist and the scientifically orientated engineer have taken the lead at the fundamental level while the application of the results has been the responsibility of the practicing engineer. More often, there has been a feedback mechanism by which the practicing engineer provides guidance to the scientist, so that fundamental information of the proper nature can be generated. This tends to be only partially true in the fire protection community. It appears fire protection engineers have been involved in basic research only to a small extent. That is regrettable in itself, but it is all the more so because there seems to be a lack of communication between the fire protection engineer and the scientists who are capable of generating vital fundamental information.

Casey, (27) in an editorial six years ago indicated his belief the fire protection engineer provided a needed contrast in approach to the procedures and operations of many fire departments relative to their development of equipment specifications, to provide an introduction to systems analysis and design, and to assist in the interpretation and application of codes and ordnances to the review of the design of buildings and structures.

However, the introduction of the fire protection engineer has been difficult to achieve in local governmental units. The building departments are usually structured in a manner more suitable to the introduction of fire protection engineers in the plan and code review phases, since these departments already employ engineering personnel. However, in most fire departments with a minimum of civilian employees, the introduction of civilian technical personnel outside of the uniformed fire department personnel often encounters resistance of both a psychological and administrative nature. Such

---

[5]William J. Christian, "The Fire Protection Engineer and the Technology Explosion," Fire Technology, IV, 4, (November, 1968), p. 321.

personnel are usually introduced only when the fire department has progressive, strong leadership and support from the local government.

It would seem the benefits and the need for the services of the fire protection engineer in the local and the state governments to provide public safety has been suitably demonstrated by many agencies. Financial and professional incentives could be instituted to provide for the adaptation of these personnel into the fire department or the building department.

There are related service employment areas which indirectly relate to public safety involving the utilization of fire protection engineers. The Insurance Services Office engineers in the evaluation of the public protection in communities throughout the United States would be a related service area. The fire protection engineers utilized in the large industrial concerns in the United States contribute to the public safety with their design of the industrial facilities to minimize the loss of production capability, the reduction of hazards to related occupancies or the community, and the conservation of an essential employment and tax resource of the community. The fire research agencies operated both by private agencies and the federal government utilize fire protection engineers in many of their applied types of research projects and studies. It is most difficult to measure the direct contribution to the public safety of the results of fire research programs or projects. However, such projects as the evaluation of materials for the interior of aircraft, rapid transit cars, and mobile homes obviously provide significant contributions to the fire

safety of the general public in both a direct and indirect manner. Finally, it should be noted that many of the fire protection engineers provide a valuable related service in the form of faculty personnel to the two-year fire related education programs in various communities on a part-time basis.

C. The Design Professional Program Population

Andrews, (6) has indicated the following needs apparently exist relative to the education of the professional design students in the colleges and the universities:[6]

1) A text and educational materials for each of the planning and design professions.

2) Guidelines for the establishment of separate programs and courses that emphasize fire safety principles and objectives.

3) Model programs and courses.

4) Faculty education in the form of seminars and workshops.

5) A centralized data bank.

6) Financial assistance.

7) Motivation.

Relative to the practicing professionals, Andrews indicated the continuing education program involve the following resources and courses:[7]

1) A text and educational materials.

---

[6]Robert L. Andrews, A Report on Fire Safety Education and Training for Urban Planners, Architects, Interior Designers and Builders. Washington, D.C. National Fire Prevention and Control Administration, August 28, 1975.

[7]Ibid., p. 9.

2) Guidelines for short courses, seminars, etc., dealing with fire safety principles and objectives that emphasize how overall objectives might be achieved utilizing the most economically efficient tradeoffs.

3) Model programs and short courses for number 2.

4) A centralized data bank.

5) Financial assistance.

6) Inclusion of fire safety on registration and licensing examinations.

7) Performance based codes and standards.

8) Motivation.

Relative to item number one for the continuing education effort, it should be noted that Egan, (37) has developed a text for the architects, and the engineering design professionals. Nelson and Fitzgerald, (89) have provided some specific suggestions relative to Andrew's recommendation for faculty education in the form of seminars and workshops. Nelson and Fitzgerald have recommended a four to six week summer institute for college and university instructors in the building design professions. The institute would consist of a basic fire-safety course for the building designers, with resource data and information. The participants would be subsidized and in return would be expected to teach the course to their students for two consecutive years. In addition, Nelson and Fitzgerald also recommended these college and university instructors could be utilized to teach evening or weekend courses for the practicing professionals, thus implementing Andrew's recommendations for model programs and short courses in a continuing education program.

Bender, (16) at the University of California predicts an increased

interest in life safety and the teaching of fire safety in the restructuring of the education of the design professionals. Relative to the practicing professionals, Bender believes the utilization of short intensive courses through the University extension service will be effective if the courses involve a format for synthesis and problem solving in their instructional design.

The American Institute of Architects, (5) have recommended increased emphasis on fire and life safety in the professional schools relative to the education of the architectural student. In addition, the architects have proposed continuing education programs for the practicing architects, and examination questions on fire and life safety for their registration examinations. The general objectives of the American Institute of Architects relative to education for fire and life safety were stated in their report as follows:[8]

> Architectural students, preregistrants and practicing architects must be provided with greater opportunity than currently exists to participate in carefully developed learning programs in design for fire and life safety. Learning aids, seminars, and courses must be made more readily available -- and their quality must be excellent. The professional responsibility of the architect to provide building occupants with reasonable safety from fire cannot be neglected. All necessary efforts must be made to assist the architect in meeting his responsibilities, and the architect must strive to become as knowledgeable as possible.

D. The Two-Year Fire Related Education Programs

It should be recognized the term two-year fire related education programs as discussed in this paper is intended to include all

---

[8] American Institute of Architects, Codes and Regulation Center, Educating the Architect: Fire and Life Safety, A Report of the A.I.A. Task Group on Fire and Life Safety. Washington, D.C., American Institute of Architects, p. 21.

of the community college programs whether of a technological orientation or an administrative-management orientation. This history of the development of these two-year programs indicate that many of these programs were initiated by the community colleges in response to the requests of the local fire department personnel. The majority of the students in many of the two-year fire related education programs are professional fire department personnel attending on a part-time basis. Thus, the usual scheduling procedure for these programs provides the identical course on both an evening and daytime basis to enable the students to attend considering their work schedules. Thus, as a result of the clientele of the two-year fire related education programs the primary audience of most of the programs consists of the professional full-time paid fire department employee. However, it must be realized many of these programs have a small number of full-time students, primarily of college age, and usually in the immediate post high school population. Some of the members of this post high school population have volunteer or call fire department experience, while others do not have any fire department experience.

Thus, it is apparent the two-year fire related education program of the fire science type, orientated on the administration-management format is designed to provide educational opportunities for members of fire departments, or personnel desiring to obtain careers in the public fire departments. However, there are additional areas of opportunities and responsibilities which have been served by the graduates of both the fire science and the fire technology orientated programs.

Zuccarelli, (130) has identified some of the specialist opportunities

for the fire science graduate in the typical public fire department organization as follows:[9]

1. Training specialist - development and revision of lesson plans; in-service training programs; prep programs for promotional exams, instructional duties on a team-teaching basis with instructional staff.

2. Fire Prevention Technicians - Plans review, code interpretations and revision, technical inspections.

3. Public Relations Specialist - Responsible for development of news releases; media contacts and coordination; fire scene reporting.

4. Administrative Trainee (personnel) - Job analysis and descriptions and evaluation. Job grading and evaluation.

5. Safety Specialist - Development of and revision of safety standards, safety inspections, safety education. Accident investigation.

In addition, Zuccarelli believes there are additional technical opportunities within many fire departments for the fire science graduate in the specialized area of communications and apparatus. It would appear, and Zaccarelli recognizes the problem, that many of the traditional personnel policies adopted in fire departments relative to entry and promotion will have to be reexamined to retain the graduate of the two-year fire related education program within the fire department. More importantly, the problems of personal frustration, boredom, lack of challenge and opportunity will be compounded as some of these graduates progress through four-year academic programs.

O'Keefe, (97) has indicated the State of Massachusetts developed a standard statewide curriculum for the community college fire science

---

[9]Louis A. Zuccarelli, "The Community College Fire Science Graduate -- What is His Future in the Fire Service?" Fire Command, XLII, 1, (January, 1975), p. 25.

programs within the state. In addition, in 1972 a transfer program for a baccalaureate degree was instituted at the University of Massachusetts. The fire related education programs in Massachusetts were designed to be located throughout the state and within twenty minutes of travel time of every organized fire department within the state. The student population in the Massachusetts programs were apparently both fire service and preservice personnel since O'Keefe reported the following in 1972.[10]

> No curriculum should be so set, as if in concrete, that cannot be revised or discarded. The Massachusetts curriculum is designed to allow the student to elect a career in industry or the fire service or both.

Oberg, (91) believed the community college fire science programs should be developed to serve the non fire service student, and should be the means for the attainment of a cadre of high quality young personnel for the fire department. Oberg also indicated the future development of the fire departments, and especially the fire department officer personnel must be obtained from the college campuses before the personnel have entered the fire department service. Additionally, he believes the existing two-year fire related education programs, due to their design to serve the student in the fire department service, with the off time dual scheduling of the courses and the limited course offerings actually prevents the full-time preservice students from enrolling in many of the community college fire related education programs. Oberg indicated the future of the fire department

---

[10]Joseph A. O'Keefe, "What's Ahead in Fire Science Degree Programs?" Fire Command, XXXIX, 12, (December, 1972), p. 21.

relative to personnel development is manifested in the development of interest in the high school students relative to a career in the fire department, and a post high school program for the full-time preservice student in the community college as follows:[11]

> If the fire service is to attract this type of person it must compete with other employers for new employees among the 70 per cent who go on to college. Quite simply, this is where the youth with imagination, self-discipline, a desire to learn and a desire to compete is to be found. To prepare him for future employment, the student must be directed into fire service programs in the post-secondary schools before he is committed to other competing disciplines; but with very few exceptions, fire service college programs, now being offered, are neither designed nor scheduled to meet the needs or convenience of the pre-employment student. Almost all are programmed for the employed fire fighter. They are offered in the evening and are doled out at the rate of three or six credits per quarter. Course content is usually so constituted and classroom jargon so fire service oriented that the pre-employment student, who may enroll, is soon confused and discouraged.

There are two-year fire related education programs as implied by Oberg which limit and restrict enrollment in the program to members of the fire service as evidenced by membership in an organized fire department. Maguire, (71) indicated the two-year Fire Command and Administration program offered at Seattle Community College requires the student to be a member of an organized fire department or be employed in an occupation closely related to the fire service. The justification for this requirement for fire department service is contained within the objectives of this specific community college program, which has been designed to prepare the individual for

---

[11] Frank E. Oberg, "The Future of Fire Service Education and Training," Fire Command, XXXVIII, 6, (June, 1971), p. 17.

command duty in the fire department. As a result, the Seattle Fire Department departmental promotional examinations have been related to these community college courses.

It would appear the population served by the Seattle Community College program is totally fire department personnel, and a rather selected group of personnel, the individuals interested in promotion to command responsibilities within the fire department. Thus in 1973 as Maguire indicated, approximately fifteen per cent of 1,100 personnel eligible for the program in the Seattle Fire Department were enrolled. Thus, the majority of the students in the two-year fire related educational programs of the fire science type offered in community colleges are part-time fire department personnel. However, the practice of a community college actively restricting the enrollment of students to members of the fire department would tend to be an exception.

1. The Two-Year Fire Technology Student Population

In contrast to the two-year fire science programs, the fire science technology, fire protection technology or fire technology programs have been designed and developed to meet the needs of the typical post high school, college age student with a limited or nonexistence experience as a member of an organized fire department. These programs include the Oklahoma State University program, and the more successful programs which have been modeled after the Oklahoma program, including the Rowan Technical Institute in Salisbury, North Carolina, and the Delaware Technical and Community College program in Wilmington, Delaware.

These programs were designed principally to prepare the post high school student for the fire protection technician positions in local government, private industry, the insurance industry, and in state government. These programs appear to have been very successful in providing the fire protection technician personnel for employment throughout the private and public sectors of fire protection. The graduates of these programs have apparently entered fire departments, through positions as fire marshals, or fire prevention technicians. The majority of the graduates from the fire related technology programs appear to enter private industry, and the insurance industry where the educational and professional values of the technician have been defined and accepted for many years.

It should not be inferred that personnel with fire department and fire service experience do not enter the two-year fire related technology programs, since many of the students in these programs have developed their interest in the academic programs from their interest or experience in the fire service, often as members of volunteer fire departments. It would therefore appear, the principal difference from the fire science program concerns the academic goals and interest, and probably most importantly the orientation and scheduling of the courses in the technology programs. Predominately, the technology programs are orientated and scheduled for the full-time student, assuming a limited experience in an organized fire department. These programs then are distinctly different from the fire science programs, organized, oriented, and administrered on a part-time dual scheduling basis for the active

participating member of the fire department.

One of the reasons the fire related technology program graduates have been utilized so intensively in private industry, insurance and state government areas, has been the inability of these graduates to enter fire departments with any consideration for their academic education relative to pay incentives, promotional opportunities, and duty assignments. In some cases, these graduates were actively discouraged from entering the fire department, and upon entrance were assigned to programs and details designed to discourage their retention.

The technology orientated two-year fire related education courses have tended to be specifically developed to prepare the students for defined career opportunities and the fire protection needs in the specific areas, related to private industry, state government, and the insurance industry. Lucht, (70) has indicated he believed one of the fundamental problem areas with the two-year fire related education programs is the very broad and general nature of the curriculum without specific career goals or objectives other than development of the individual's capabilities to become an improved member of the fire department. Lucht, has recommended the development of specific curriculums related to the career specialities within the fire department. These curriculum would be directly related to the selection of the area of interest and career service by the individual fire department member as follows: A fire inspection option, a fire investigation option, and a public fire education option. Additionally, an emergency services option would be available for the fire department member desiring to pursue the traditional non fire prevention related fire department activities.

Lucht believed the development of the specific course curriculums as options in the fire related education programs would provide fire department personnel the opportunities to pursue programs of education directly related to their career objectives. This type of specific program should undoubtably result in an improved level of personnel within the fire departments. A secondary and indirect benefit of the offering of specific course curriculums in the highly specialized career areas of the fire department, would be the restructuring of the scheduling, orientation, and administration of the fire science programs at many community colleges. Due to the smaller number of students enrolling in such options, a community college might have to specialize in offering only the option in one career area, thus allowing an adjacent college to specialize in the other area. This restructuring might accelerate the investigation of innovative methods for the delivery of the educational programs, including the open university concept, modified correspondence courses, and programmed or televised courses. It should be recognized, however, that Lucht's restructuring of the two-year fire related education program to specific career options within the fire department envisions these programs continuing to serve their current primary student population, the members of organized fire departments.

E. The Four-Year Fire Related Education Program

The four-year fire related education programs, excluding the Fire Protection Engineering programs, have been designed to serve the student

population consisting of the graduates of the two-year fire related education programs. It is to be expected in the immediate future during the next five to ten years additional programs will be initiated, and some of these programs will be designed as articulation programs with the two-year programs, and some will be expanded former two-year programs.

As previously related, O'Keefe, (97) indicated the University of Massachusetts initiated a transfer program for the graduates of the two-year programs in 1972. Maguire, (71) indicated the University of Puget Sound has provided a full credit transfer program for the graduates of the Seattle Community College to enroll in a baccalaureate degree program in public administration. The Consortium study, (58) indicated there were a total of nineteen baccalaureate programs in colleges and universities in 1975, and it should be remembered that two of these programs were in fire protection engineering. While four of these programs were in fire protection or fire science technology, three of the programs involved an administration orientation, one of the programs was in forest fire sciences, and four of the programs indicated a fire science orientation.

The complete listing of the program titles and the institutions offering the four-year fire related education programs as identified by the Consortium study, (58) in 1975 are presented in Table III on page 46. It should be noted the majority of the institutions offering baccalaureate degrees in the fire related educational programs offer a single degree. However, the University of Maryland, the University of New Haven, the John Jay College of Criminal Justice, and the University of Cincinnati all indicated they provide two four-year fire related baccalaureate degree programs. In addition, Humboldt State University in Arcata, California is the only

TABLE III

FIRE RELATED BACCALAUREATE DEGREE PROGRAMS*

Institution	Title of Program
California State University Los Angeles, California	1. Fire Protection Administration
Humboldt State University Arcata, California	1. Forest Fire Science
University of New Haven New Haven, Connecticut	1. Fire Science Administration 2. Fire Science Technology
University of South Florida Tampa, Florida	1. Industrial and Technical Education for Fire Administrators
Illinois Institute of Technology Chicago, Illinois	1. Fire Protection and Safety Engineering
Eastern Kentucky University Richmond, Kentucky	1. Fire Prevention and Control
University of Maryland College Park, Maryland	1. Fire Protection Engineering 2. Urban Studies - Fire Science
Boston State College Boston, Massachusetts	1. Public Service - Fire Science
Madonna College Livonia, Michigan	1. Fire Protection and Occupational Safety
University of Minnesota Minneapolis, Minnesota	1. Independent Study
Central Missouri State University Warrensburg, Missouri	1. Public Services - Fire Science
Jersey City State College Jersey City, New Jersey	1. Administration of Safety and Security Services
John Jay College of Criminal Justice New York, New York	1. Fire Science 2. Fire Service Administration
University of Cincinnati Cincinnati, Ohio	1. Fire & Safety Engineering Technology 2. Fire & Industrial Safety Technology
Oklahoma State University Stillwater, Oklahoma	1. Fire Protection and Safety Engineering Technology
Totals 15	19

*International Association of Fire Chiefs, the International Association of Fire Fighters, The International Society of Fire Service Instructors, the National Fire Protection Association, Report on a Survey of the Fire Education and Training Programs. Washington, D.C.; National Fire Prevention and Control Administration, December 3, 1976.

institution offering both a baccalaureate and a Masters Degree, with the baccalaureate degree in Forest Fire Science, and the Masters Degree in Forest Resource Management. It should be remembered we have previously identified the University of Washington, Seattle as providing the other Masters Degree in a fire related education program, with their program in Fire Management and Science offered as a forestry option area of study.

Apparently, the four-year fire related education programs, with the exception of the forestry related programs, the fire protection engineering programs, and to some extent the fire protection technology programs, have been developed as articulated programs for the graduate of the two-year fire related education program in the community college. The program in Urban Studies - Fire Science at the University of Maryland has restricted the enrollment into the program to students transferring from fire related education programs in the community colleges.

F. Identification of the Audiences

The audiences and student populations of the various fire related education programs may be identified and characterized relative to the existing programs in the community colleges, the colleges and universities. These identical student populations and audiences served by the various existing fire related education programs may also be characterized by their relationship and identification with the Fire Service. The following student populations have been identified as the design audiences for the various types of fire related academic education programs.

1. The Pre-service Population

This student population is composed primarily of high school graduates and is one of the principal populations served by the two and four-year fire related education programs of both the fire technology and the fire science type in the community colleges. In addition, segments of the high school population, primarily at the senior student level, have been the audience for several unique high school programs, in cooperation and conjunction with two-year fire related education programs in the community college and the local fire department. The fire department relationship to the pre-service population and the sponsoring of these educational programs for the high school student has been predicated on the recruiting benefits of these programs when the educational program is articulated with a fire department cadet or apprenticeship program.

2. The Fire Service Population

The members of professional and volunteer fire departments are primarily being served by the two-year fire related education programs of the fire science or fire technology type in the community colleges. Some of these two-year fire related education programs in the various community colleges have restricted their students in these programs to members of the fire service population. However, the majority of these programs appear to be unrestricted relative to student enrollment, althought the scheduling and administration of the fire science orientated courses tends to restrict the pre-service student. Due to this emphasis on the enrollment of existing fire service personnel, the enrollment of

female students in the majority of the fire science or fire technology programs is virtually nonexistent.

3. The Two-Year Fire Related Education Program Graduate

The two-year fire related education program graduate is presently the primary or secondary audience for nineteen baccalaureate degree programs of the four-year fire related educational type, oriented in forestry, administration, technology, or engineering. These programs presently vary from the fire protection engineering programs which receive approximately 5 to 10 per cent of their students from the two-year fire related education programs. While the four-year fire technology, fire science, or fire administration programs usually receive 95 to 100 per cent of their students from the two-year fire related education programs. It should be noted, the Urban Studies - Fire Science program at the University of Maryland receives all of its students from the two-year fire related education programs in the community colleges, since articulated transfer from these programs is the only means of enrollment in the program.

4. The Fire Protection Engineering Student Population

The fire protection engineering programs have the primary audience consisting of the post high school student population interested in entering the related service areas in fire protection consisting of industry or insurance, or students interested in becoming a fire protection engineer in a local or state agency. This population primarily consists of full-time college age students, many with previous

fire department experience in a volunteer or professional fire department. These students are intensely interested in the areas of fire protection related to the construction of buildings, water supply systems, industrial protection, the design of protection systems or devices, and fire research applications.

5. The Related Student Populations

The students in related professional areas, primarily the architectural, urban planning, interior design, building construction, and related engineering students including civil, electrical, industrial, mechanical, and chemical engineering, are presently not identified as primary audiences of any of the fire related education programs. The full-time college students in the related professional area of forestry are primarily served with the existing graduate and undergraduate programs in forest fire science and forest fire management. It should be noted however, that North Carolina State University has instituted a senior level course as an elective for civil engineering students in fire protection engineering. This course is presently under study for establishment as a required course for all engineering students involved with the design and construction of buildings, including the students in the school of architecture. The University of Kentucky for a number of years, had a general course in fire protection engineering, which was required of all the engineering students in the College of Engineering.

It should be noted that some students, always take many courses during their college careers, and the fire protection engineering programs usually have a number of students, ever semester, enrolled in the courses

from related disciplines due to personal or professional interest. The University of Maryland has enrolled students from the following academic disciplines in fire protection engineering courses during the past five years: Electrical Engineering; Mechanical Engineering; Aerospace Engineering; Chemical Engineering; Civil Engineering; Architecture; Education, Recreation; Physical Education and Health; Business Management; Industrial Education; Industrial Psychology; and Safety Education.

6. The Practicing Professional Population

The professional involved with the design and the construction of structures and buildings are presently not identified as the primary or secondary audiences for the fire related education programs in colleges or universities. The practicing professionals in the professional areas of architecture, interior design, urban planning, construction, and the related engineering areas; consisting primarily of mechanical, civil, electrical, chemical and industrial engineering are presently provided with limited educational programs of the short course or seminar type provided by their professional organizations or the fire protection professional organizations. However, some colleges and universities are developing interest in serving these audiences through their continuing or adult education divisions, and within the past two years, seminar programs have been conducted of a general type in fire protection engineering for academic credit at both the University of Alaska, and North Carolina State University.

The identified student populations and the existing fire related educational programs serving the student populations have been summarized

in Table IV on page 53.

G. Populations Not Identified with Existing Programs

There is one principal segment of the fire department population which has not extensively participated in either the two-year or four-year fire related education programs. The personnel consistently absent from such programs are the top executives in the fire departments, the chief, and the deputy and assistant chiefs. The extensive time commitments involved in the academic education program and the psychological-sociological inhibitions involved in the competitive classroom situation with subordinates may be the principal factors resulting in the almost total lack of participation by the chief executive officers of fire departments. Participation in these programs has been evidenced at the battalion or district chief position, consisting of the chief officer in professional contact with the operational personnel, and still assigned to the psychological-sociological environment of the fire station.

Frohman, Schulman, and Roberts, (51) have indicated one of the principal problems to providing innovations in fire departments is the lack of management techniques by many fire officials. They have recommended management training courses for the new officer promoted into a management position.

In addition to the chief executive officers of the fire departments, as previously indicated, the members of the design professions involved in the construction of buildings are also usually absent from the existing fire related educational programs. The lack of involvement of the design

TABLE IV

IDENTIFIED STUDENT POPULATIONS - AUDIENCES SERVED BY EXISTING ACADEMIC FIRE RELATED EDUCATION PROGRAMS

Student Population	Academic Program
Pre-Service	
High School	Joint High School - Community College
Post High School	Community College Fire Science Fire Technology
	College-University Fire Science Fire Technology Fire Protection Engineering
Fire Service	
Post High School	Community College Fire Science Fire Technology
Community College Graduate	
Fire Science ..... Fire Technology General	College-University Fire Science Fire Technology Fire Protection Engineering
Related College Students	
Architecture ..... Interior Design Urban Planning Engineering Areas Forestry	College-University Fire Protection Engineering Fire Science Fire Technology Forest Fire Science - Management
Practicing Professionals	
Architects ..... Interior Designers Urban Planners Engineers	College-University Continuing Education Fire Protection Engineering
	Professional Organizations Seminars

personnel may be primarily related to the scheduling of the relevant fire related courses for the part-time fire department students, and the lack of relevant fire related education courses in many areas of the United States. The Fire Protection Engineering enrollment at the University of Maryland for the past ten years has contained many professional personnel on a part-time basis studying for an additional baccalaureate degree, due to their prevalent professional education needs related to their professional assignments. In addition, one week fire protection engineering courses for professional personnel consisting of senior fire department personnel, chiefs, fire protection engineers, and fire marshals, and design personnel including engineers and architects, have been provided by the University of Alaska at both Anchorage and Juneau. Professional fire protection engineering seminars of one week duration have also been conducted by federal government agencies, with the National Aeronautics and Space Administration sponsoring twelve of these programs during a four year period. In addition to the federal agencies, a four week specialized fire protection engineering seminar of a continuing education type for the engineering personnel of the Insurance Services Office have been conducted for the past three years. These intensive limited time programs have been developed to meet the professional and educational needs and requirements of the fire protection related professional.

It would appear some of the interest in continuing education by the practicing design professionals such as the architects and the engineers could be utilized in a professional society seminar type of fire related education program. It would seem obvious the part-time fire department student with a previous baccalaureate degree who now

obtains a second baccalaureate degree in a fire related education program would be a serious candidate for a graduate degree in a fire related education program. The part-time student interested in the present limited seminar offerings might also be attracted to a graduate program on a part-time basis.

It is possible the offering of part-time graduate programs in fire related education programs and seminar courses in specific fire protection aspects of design problems would be a partial solution to the educational needs of the practicing design professionals. The development of education programs for the fire chief, and the executive chiefs in the fire department might be best initiated with seminar programs limited to chiefs of similar ranks from various departments within a regional area. Due to the varying academic backgrounds and preparation of the fire chiefs, an academic credit option and a noncredit option would probably have to be provided. The provision of a one week seminar where the chief officers are removed from the psychological and sociological inhibiting variables of competition with their subordinates would appear to have interesting educational possibilities.

The provision of fire related education programs of two or three day duration have been conducted on a very successful basis by the National Fire Protection Association and the American Society of Heating and Air Conditioning Engineers. The National Fire Protection Association seminars have been of two day duration on the Life Safety Code, with a programed text approach utilizing a visual and sound presentation. The instructor provides the reinforcement and review of the problem exercises in the text with a discussion session immediately

following the presentation. This program has required a minimum of instructional personnel with the utilization of the programed text and the coordinated visual and sound presentation of slides and tape.

The American Society of Heating and Air Conditioning Engineers have presented a three day program on the application and design of heating and air conditioning systems for the fire safe design and construction of high rise buildings. This program has been most popular and is structured in the traditional manner with a number of instructors involved with presentations. The success of both of these instructional approaches and the continued success of the tuition supported workshops sponsored by the International Association of Fire Chiefs, immediately prior to their annual meeting would tend to indicate the seminar type of education program appears to be efficient and effective. Thus, seminars should be attractive to the two student populations not now actively participating in the academic fire related education programs, the fire chiefs, and the related practicing professionals, primarily the architects, and the building design professionals.

Bartholomew, (13) recently suggested the presentation of short courses and seminars on the essential aspects of fire protection and fire protection engineering to be conducted by the American Society of Interior Designers in coordination and cooperation with the National Fire Protection Association. These seminars would tend to have increased incentives for attendance when they are sponsored by the student population professional groups, and when the program is designed, structured, and arranged to fulfill college or university requirements,

so academic credit could be earned by the students desiring the option of attending for academic credit. The offering of seminars and short courses for the practicing professionals would be more efficient to these populations if the programs were offered in cooperation with the professional societies at the time of their regional or national meetings.

V. THE NATIONAL ACADEMY FOR FIRE PREVENTION AND CONTROL

The future role of the National Academy for Fire Prevention and Control relative to the present academic fire related education programs offered by various colleges and universities will be evolved as the Academy is established in its facilities in Washington, D.C., (85) and the proposed programs are initiated. For the purposes of this report, it has been assumed the National Academy for Fire Prevention and Control will be initiating the programs detailed in the November, 1976 draft of the five year plan. (83) It is also assumed the report from the Academy for Educational Development, (2) the Report of the Site Selection Board, (85) the Report of the National Commission on Fire Prevention and Control, (84) and Public Law 93-498, (101) were reference sources for the five year plan.

A. Recommended Roles and Programs

The Academy for Educational Development, (2) recommended the following characteristics for the National Academy for Fire Prevention

and Control.[12]

1. The Academy should serve as a highly visible symbol of the importance of advanced training and the increased professionalization of the fire service.

2. The National Academy must have an impact on millions of fire fighters and others. Consequently, in addition to on-site instruction, the Academy will need to bring its courses to states and communities across the country.

3. Through an active program of curriculum development and dissemination, the Academy should attempt to upgrade the quality of fire education and training (and, in the process, the quality of fire prevention and control) throughout the United States.

4. The Academy, as noted, should function primarily as an educational institution. Accordingly, it should be a center of learning, of experimentation, of innovation in areas of fire education and training that are not covered by existing programs. As such, the Academy should not be a school for recruits or a traditional fire academy that instructs in the use of hoses, ladders, and masks; teaching the use of these and other fire equipment is the responsibility of the state and local fire departments and academies.

5. The Academy should serve a leadership function. This function is especially challenging since the academy should, in the absence of federal regulations and standards, be probing the unknown or working in undefined areas and on problems that remain unresolved.

6. The Academy should have a national focus. It should serve at the top of a three-tier education and training system, with the state and local units comprising the other sources of training for fire service personnel.

7. The Academy should be a place that will attract fire specialists from across the country to exchange information and discuss problems and new ideas.

---

[12]Academy for Educational Development, Inc., A Guide for Planning and Selecting the Site for the National Academy for Fire Prevention and Control. Washington, D.C. National Fire Prevention and Control Administration, November 15, 1975, p. 23-25.

In addition to recommending these basic characteristics for the National Academy for Fire Prevention and Control, the Academy for Educational Development indicated the Academy's programs should be related to the following five essential component areas:[13]

1. Education and Training.
2. Curriculum Development.
3. Development of Reference and Research Material.
4. Technical and Financial Assistance.
5. Relationships with Higher Education Institutions.

An examination of these essential component areas indicates they all have some impact on the component area number five, relative to the relationship with higher education institutions. All of these components have some critical impact on the existing fire related education programs in the colleges and universities. Concerning the first item relative to education and training the Academy for Educational Development recommends a student body composed of 85 per cent fire service personnel and 15 per cent from other professionals. These other professionals are to include arson investigators, government officials, college and university instructors, builders, architects, fire protection engineers, criminal justice personnel, interior designers, city planners, and officials from other government agencies with responsibilities for fire prevention and control. The Academy for Educational Development Report, (2) envisions the National

---

[13]Academy for Educational Development, Op. Cit., p. 26.

Academy for Fire Prevention and Control providing programs for as many as 12,000 students participating in as many as fifty different courses in a year, these courses would vary in time sequence from three days to two or three months.

The Academy for Educational Development, (2) summarized their concepts of the broad nature of the educational and training responsibilities of the National Academy with the following statement:[14]

> The result is that the Academy would educate people from all segments of the fire service and from other professional communities. Some 10 to 15 programs, of various lengths and on various topics, should be offered at the same time.

The involvement of the National Academy in fire related education program curriculum development was recommended by the Academy for Educational Development to provide curricula for the various fire related education courses of the Academy, which considering the proposed fifty courses, would appear to be an intensive task. The recommendations for the development of curricula included recommended procedures for the dissemination of the fire related education course materials to state and local agencies.

The Academy for Educational Development also recommended the establishment of a comprehensive library with the National Academy to facilitate the utilization of reference and research material. The library as proposed would have computer terminal capability for access to the national fire data system of the National Fire Prevention and Control Administration. In addition, an educational reference information service

---

[14] Academy for Educational Development, Op. Cit., p. 35.

was recommended to provide resource materials and perform research service for state and local agencies, related to the educational and training programs and techniques in a media center approach.

The Academy for Educational Development, (2) also supported the provision of technical and financial assistance which was established in the provision for the National Academy for Fire Prevention and Control under the enabling legislation, Public Law 93-498. (101) The two provisions which would seem to have the most critical impact on the existing fire related education programs in the colleges and universities involve the following provisions:[15]

> Financial assistance, in the forms of stipends and loans, to enable fire fighters to attend academy courses or courses offered at colleges and universities.
>
> Financial and technical assistance to colleges and universities to develop or update fire education degree programs and courses; and to encourage these institutions to maintain standards of academic excellence in the fire programs.

In the essential component area of the relationships with higher education institutions, the Academy for Educational Development recommended the National Academy for Fire Prevention and Control involve the following mechanisms and procedures relative to their relationships with the existing fire related education programs as follows:[16]

a. Academy accreditation of individual programs at various

---

[15] Academy for Educational Development, Op. Cit., p. 45-46.

[16] Ibid., p. 46-47.

institutions, especially those that receive federal and state aid, in accordance with the standards set by the Joint Council of National Fire Service Organizations. Accreditation is essential in order to raise the level of professionalism of fire service personnel as provided in Public Law 93-498.

b. Arranging with individual institutions to award credit for the programs offered or accredited by the Academy and to grant certificates and degrees for completion of such programs. Although the Academy, as currently conceived would not award degrees, it should provide opportunities for fire service personnel to earn degrees awarded by other institutions. This could be accomplished in several ways:

   By (as just noted) having higher education institutions offer credits for the Academy's training;

   By having fire service personnel enroll in college courses offered at the higher education institution, at the Academy's national facility, or at designated decentralized locations;

   By arranging with a college or univeristy system or with an individual institution to offer credits and degrees on the basis of an open university type of arrangement, which features independent study and programmed instruction;

   By arranging with higher education institutions to offer credits for relevant life experiences; and

   By having fire service personnel take "college proficiency examinations," and, upon passing, receive credits for accumulating a body of knowledge in an academic area.

Thus, the Agency for Educational Development has recommended the National Academy for Fire Prevention and Control should be involved in the process of arranging with academic institutions to provide opportunities for fire department personnel to obtain credits toward degrees for Academy courses.

B. Legislative Mandated Responsibilities

The essential functions and objectives of the National Academy for Fire Prevention and Control were initially established in detail in the Public Law 93-498, "Federal Fire Prevention and Control Act of 1974", (101) in the following manner:[17]

> Sec. 7. (a) ESTABLISHMENT - The Secretary shall establish, at the earliest practicable date, a National Academy for Fire Prevention and Control. The purpose of the Academy shall be to advance the professional development of fire service personnel and of other persons engaged in fire prevention and control activities.
>
> (d) PROGRAM OF THE ACADEMY - The Superintendent is authorized to-
>
> (1) Train fire service personnel in such skills and knowledge as may be useful to advance their ability to prevent and control fires, including but not limited to-
>
> (A) techniques of fire prevention, fire inspection, fire fighting and fire and arson investigation;
>
> (B) tactics and command of fire fighting for present and future fire chiefs and commanders;
>
> (C) administration and management of fire services;
>
> (D) tactical training in the specialized field of aircraft fire control and crash rescue;
>
> (E) tactical training in the specialized field of fire control and rescue aboard waterborne vessels; and
>
> (F) the training of present and future instructors in the aforementioned subjects;
>
> (2) develop model curricula, training programs, and other educational materials suitable for use at other educational institutions, and to make such materials available without charge;
>
> (3) develop and administer a program of correspondence courses to advance the knowledge and skills of fire service personnel;
>
> (4) develop and distribute to appropriate officials model questions suitable for use in conducting entrance and promotional examinations for fire service personnel, and;

---

[17]Public Law 93-498, Federal Fire Prevention and Control Act of 1974, Washington, D.C. 93rd Congress, S. 1769, October 29, 1974, p. 3-5.

(5) encourage the inclusion of fire prevention and detection technology and practices in the education and professional practices of architects, builders, city planners, and others engaged in design and planning affected by fire safety problems.

(e) TECHNICAL ASSISTANCE-The Administrator is authorized, to the extent that he determines it necessary, to meet the needs of the Nation, to encourage new programs and to strengthen existing programs of education and training by local fire services, units, and departments, State and local governments, and private institutions, by providing technical assistance and advice to-

(1) vocational training programs in techniques of fire prevention, fire inspection, fire fighting, and fire and arson investigation;

(2) fire training courses and programs at junior colleges; and

(3) four year degree programs in fire engineering at colleges and universities.

(f) ASSISTANCE- The Administrator is authorized to provide assistance to State and local fire service training programs through grants, contracts, or otherwise. Such assistance shall not exceed 4 per centum of the amount authorized to be appropriated in each fiscal year pursuant to section 17 of this Act.

(i) EDUCATIONAL AND PROFESSIONAL ASSISTANCE - The Administrator is authorized to-

(1) provide stipends to students attending Academy courses and programs, in amounts up to 75 per centum of the expense of attendance, as established by the Superintendent;

(2) provide stipends to students attending courses and nondegree training programs approved by the Superintendent at Universities, Colleges and junior colleges in amounts up to 50 per centum of the cost of tuition;

(3) make or enter into contracts to make payments to institutions of higher education for loans not to exceed $2,500 per academic year for any individual who is enrolled on a full time basis in an undergraduate or graduate program of fire research or engineering which is certified by the Superintendent. Loans under this paragraph shall be made on such terms and subject to such conditions as the Superintendent and each institution involved may jointly determine; and

(4) establish and maintain a placement and promotion opportunities center in cooperation with the fire services, for fire fighters who wish to learn and take advantage of different or better career opportunities. Such center shall not limit such assistance to students and graduates of the Academy, but shall undertake to assist all fire service personnel.

(K) ACCREDITATION- The Superintendent is authorized to establish a Committee on Fire Training and Education which shall inquire into and make recommendations regarding the desirability of establishing a mechanism for accreditation of fire training and education programs and courses, and the role which the Academy should play if such a mechanism is recommended. The Committee shall consist of the Superintendent as Chairman and eighteen other members appointed by the Administrator from among individuals and organizations possessing special knowledge and experience in the field of fire training and education or related fields. The Committee shall submit to the Administrator within two years after its appointment a full and complete report of its findings and recommendations. Upon the submission of such report, the Committee shall cease to exist. Each appointed member of the Committee shall be reimbursed for expenses actually incurred in the performance of his duties as a member.

Upon examination of the authorization legislation, (101) and the planning guide prepared by the Academy for Educational Development, (2) the National Academy for Fire Prevention and Control has extensive responsibilities and objectives. It would appear the Academy will require extensive staff, and faculty, with a detailed and suitably developed physical plant to fulfill the extensive legislative mandated responsibilities; The Academy for Educational Development report recommended the following staffing levels to meet the recommended goal of fifty courses:[18]

> The implementation of the Academy's program and the maintenance of the Academy's facility will, in AED's views, require a core instructional staff of 47, an off-site instructional staff of 25, a correspondence instructional staff of 7, a staff of administrators, technical specialists, clerical and secretarial personnel, and other support personnel.

However, the Environmental Impact Assessment Report of the National Academy for Fire Prevention and Control, (8) predicts a

---

[18]Academy for Educational Development, Inc., A Guide for Planning and Selecting the Site for the National Academy for Fire Prevention and Control. Washington, D.C. National Fire Prevention and Control Administration, November 15, 1975, p. 69.

future growth by 1980 of 200 persons for both the Academy and the National Fire Prevention and Control Administration, as being adequately supported on the selected site at the former Marjorie Webster Junior College in Washington, D.C.

C. Five Year Plan Drafts-National Academy

The Five Year Plan Drafts of the National Academy for Fire Prevention and Control, (83) represent approximately a one year progression from the recommendations and objectives developed in the Academy for Educational Development Planning Guide. (2) The Five Year Plan data and information was developed by the staff of the National Academy for Fire Prevention and Control relative to the fiscal years of 1976 through 1980. The purposes and goals of the National Academy for Fire Prevention and Control as stated at the beginning of the five year plan are listed as follows:[19]

> develop education and training programs for use at
> Federal, State, and local levels,
> conduct courses of education and training,
> conduct short courses, seminars, workshops, and
> conferences and technically and financially support
> education and training at the State and local levels.
>
> Subject areas to be covered by the Academy programs include:
>
> fire prevention
> fire and arson investigation,
> fire service administration and management,
> instructor training,
> master planning,
> fire safety practices for architects, interior designers,
> and urban planners,
> marine, and
> aircraft.

---

[19]National Academy for Fire Prevention and Control, Five Year Plan Drafts, Education and Training, Washington, D.C. Fire Prevention and Control Administration, November, 1976, p. 2.

The specific activities and programs as related to objectives in the Five Year Plan which appeared to have a direct impact on the existing fire related education programs in colleges and universities are listed. The programs are quoted with the plan objective, the description of the program, and the desired result relative to the overall objectives and goals of the National Academy for Fire Prevention and Control:

ACAD-5 Objective: The establishment of a "Committee on Fire Training and Education."

DESCRIPTION: This committee will consist of the Superintendent (who will serve as chairman) and eighteen members possessing special knowledge and experience in the field of fire training and education. Members will be chosen to provide representation from appropriate fire organizations. The function of this Committee will be to make recommendations concerning the establishment of a mechanism for the accreditation of fire training and education programs presented by Federal, State and local organizations. The Committee will also prepare a report containing recommendations concerning the role of the Academy in the accreditation process.

RESULT: The primary result of this objective will be a report containing the recommendations for the establishment of a mechanism for the accreditation of fire training and education programs and the corresponding role of the Academy.

ACAD-7 Objective: The development of effective teaching techniques for fire protection education and training.

DESCRIPTION: Educational research will be conducted on various instructional methods and techniques to determine their effectiveness and applicability to fire protection education and training. Effective techniques will be adopted for utilization in Academy programs and recommended for use in State and local programs.

RESULT: The utilization of effective instructional technology in Federal, State, and local training programs.

ACAD-8 Objective: The dissemination of "model" questions suitable for use in fire service entrance and promotional examinations.

DESCRIPTION: "Model" questions for use in entrance and promotional examinations will be developed to meet the needs of local government administrators. These questions will be designed to meet applicable requirements such as fair employment practices, etc. Model examinations will be disseminated to appropriate State and local government officials as requested.

RESULT: Validated examinations which will meet legal and operational requirements, and thereby improve the professional development of fire services.

ACAD-9 Objective: The determination of the optimal role for community colleges, colleges and universities in the fire service education and training process.

DESCRIPTION: The Academy will conduct a program to identify the optimal role of colleges and universities, and develop a corresponding package containing:

- recommended curricula
- model community college/fire service, and
- cooperative agreements.

The package developed in this area will be used as the prototype for implementation of programs in other areas.

RESULT: The implementation of optimal fire service education and training programs by community colleges.

ACAD-17 Objective: The development and presentation of model courses in fire safety practices for architects, builders, interior designers, and urban planners.

DESCRIPTION: This objective provides for the development of 3 courses in fire safety practices associated with the planning, designing, constructing, and furnishing of buildings:

1. Fire Safety for Practicing Architects,
2. Fire Safety for Architectural Educators, and
3. Fire Safety for Students of Architecture.

Curricula, student and instructor handbooks, and audiovisual aid materials will be prepared for each course.

RESULT: Personnel who are trained in the fire safety aspects of building, planning, designing, construction, and furnishing.

ACAD-24 Objective: The provision of technical assistance concerning fire protection, education and training programs to vocational schools, community colleges, colleges, and universities.

DESCRIPTION: The Academy will support the development and conduct of education and training programs at these institutions by providing:

- technical assistance,
- advice to faculty and staff,
- information materials, and
- instructions concerning the use of special techniques such as simulation exercises, role playing, team teaching, and programmed instructions.

RESULT: Improved new and existing fire protection education and training programs.

ACAD-25 Objective: The implementation of a statewide fire protection education and training system by all of the states and territories.

DESCRIPTION: Grants will be awarded to States and territories which currently do not have a statewide fire prevention and control education and training system (e.g. A State academy or a fire training division). These grants will be for the purpose of designing such a system.

---

* It is anticipated that the designs will be formally implemented by the State.

RESULT; A statewide education and training system designed for each of the States and territories which do not already have such a system.

ACAD-26 Objective: The implementation of comprehensive five-year statewide fire education and training plans by the States and territories.

DESCRIPTION: Those States and territories which have established education and training systems (see Objective ACAD-25) will be eligible to receive grants for the development of corresponding statewide fire education and training programs, thus eliminating duplicate efforts and deficiencies. The plans will also provide the Academy with information concerning each State's fire education and training program.

RESULT: A comprehensive five-year statewide fire education and training plan developed and implemented by each of the States and territories.

ACAD-27 Objective: The delivery of model Academy fire education and training programs at State and local levels.

DESCRIPTION: Grants will be awarded to State and local agencies to present fire educational and training programs which are considered critical to the objectives of the Academy. To be eligible for these grants, the States must have an educational training system and a five-year plan (see Objectives ACAD-25 and ACAD-26) and the supported programs must be elements of the plan.

RESULT: The presentation of fire education and training programs which are considered by the Academy to be necessary for the improvement of fire protection in the Nation.

ACAD-28 Objective: The establishment of a system of articulation agreements with colleges and universities.

DESCRIPTION: The Academy will enter into specific agreements with selected colleges and universities so that these institutions will offer equivalent academic credits to individuals who complete Academy courses. Thus, studies at the Academy would apply toward the satisfaction of degree requirements.

RESULT: College credits for students who complete specific Academy courses.

ACAD-30 Objective: The provision of financial support to students attending fire education courses and nondegree training programs at colleges, universities, and community colleges.

DESCRIPTION: Selected students participating in nondegree fire education and training programs approved by the Academy will be eligible to receive stipends covering up to 50 per cent of the cost of tuition.

RESULT: Increased enrollment in nondegree fire education and training programs.

ACAD-31 Objective: The provision of loans to individuals enrolled in University fire research/engineering programs.

DESCRIPTION; Loans for educational expenses will be made to full-time students enrolled in fire research/engineering programs at colleges and universities. These students may be at the graduate or undergraduate level and may receive a maximum of $2,500 each year. The Academy will enter into contracts with participating colleges and universities, and the loans will actually be made through the institutions. Repayment conditions will be established jointly by the Academy Superintendent and the institution.

RESULT; An increased number of students enrolled in fire research/engineering programs.

ACAD-32 Objective: The development of innovative fire service education and training through college and university research programs.

DESCRIPTION: This objective will be accomplished by graduate students conducting research on fire service education. These students will be supported by Academy grants.

RESULT: Improved fire protection education programs for use at all levels.

ACAD-33 Objective: The development of innovative fire education and training programs by State and local agencies.

DESCRIPTION: This objective provides for the financial support of the development of selected innovative programs through grants awarded to leading State and local fire service agencies. These programs will be developed for nationwide use (as contrasted to ACAD-27 which supports the development of education and training programs for internal use and will have a significant impact on the improvement of fire prevention and control.)

RESULT: The development of effective fire education and training programs which are transferrable to agencies throughout the Nation.

ACAD-35 Objective: The development and implementation of a correspondence course system for fire education and training.

DESCRIPTION: A study of correspondence course systems and related nontraditional approaches to fire service education and training will be initiated in 1977 in order to establish an effective academy program. This study will determine alternative correspondence course system configurations; which Academy courses lend themselves to this instructional method; and procedures for administering such systems. The results of this study will be utilized to design a correspondence course system for the Academy - the system will then be implemented and administered on a continual basis.

RESULT: An operational correspondence course system for fire service personnel.

ACAD-36 Objective: The distribution of model curricula and related materials to fire education institutions.

DESCRIPTION: Education and training curricula and related materials developed in 1976 will be disseminated to educational institutions in 1977 to provide wider educational opportunities for fire service personnel and others engaged in fire protection activities, in order to increase their professional expertise. This objective will be accomplished by the most cost-effective means-possible using a fire service organization.

RESULT: Broad utilization of Academy developed curricula and related materials by fire service educational institutions.

These sixteen program objectives from the five year plan draft of the National Academy for Fire Prevention and Control, (83) which were identified and cited as having a significant influence on the existing fire related education programs in colleges and universities were examined. The identification and selection of these sixteen objectives was admittedly limited by the personal biases and professional experience of the investigator. The sixteen program objectives were examined in detail and the suggested modifications relative to some of the objectives are included in section VII of this report. It should be remembered, the entire outline of the objectives were not included with the justification of the objective, and the tasks relegated to the time frames for accomplishment were also omitted.

VI. IDENTIFIED PROBLEM AREAS WITH EXISTING PROGRAMS

The existing fire related education programs in the colleges and the universities have endured an extended period of very rapid growth and development from the early 1960's through the early 1970's. Thus, it is to be expected there are now recognized areas of conflicting ideas and opinions relative to the objectives and policies, and the future structure of the programs. The rather specialized and unique nature of the student populations as previously examined in Section IV of this report, have created unusual education and articulation problems. As a result of the investigation involved in this study, an awareness of some of these problems was achieved. Thus, identification and summary of the areas which appeared to be the most critical has been attempted.

A. Enrollment Policies

A number of the fire related education programs in the community colleges have apparently restricted the enrollment in the fire related educational programs and courses to members of organized fire departments. This policy would appear to severely restrict the enrollment of the pre-service student, and of course also effectively restricts the enrollment of female students. Maguire, (71) reported the two-year program at Seattle Community College required the prospective student to be a member of an organized fire department. Owen, (94) at the Region 10 Fire Service Needs - Analysis Seminar reported the often accepted opinion of fire department members, that a student should not be permitted to continue in a fire related education program if the student can not meet the physical acceptance criteria of the local fire departments. Thus, the limiting nature of the fire related education programs which limit their enrollment to fire department members appears to be very evident, and definitely self-defeating to their objective of educating the fire service student populations. It should be remembered, Oberg, (91) indicated in section IV of this report, the fire departments need to actively recruit the pre-service student in the fire related education programs in the colleges for their officer positions.

The policy of restricting enrollment in the fire related education programs to members of organized fire departments tends to indicate a manifestation of a lack of understanding of the professional opportunities for the graduates of the two-year fire related education programs beyond

the local fire department. Ross, (107) reported on the capabilities of the graduates of the two-year fire related education program in fire science offered at Cuyahoga Community College, and indicated the student is prepared to enter the areas of private protection, sales and service, insurance ratings, or fire investigation.

One procedure in which fire departments can benefit from an open enrollment policy in the fire related education program is through the implementation of a fire cadet or an apprentice fireman program. Antonio, (7) has reported on the apprentice program initiated in the Bancroft Fire Protection District in Colorado. This program consists of two and a half years of study, and as one condition of their apprenticeship the personnel are required to attend the classes in the fire technology program at the Community College of Denver. Antonio reported the primary objective of the apprentice program in the following manner.[20]

> Our apprenticeship program was designed to develop in no more than three years a well-trained and formally educated man who can enter the full-time ranks of the fire service at an early age.

Ross, (107) reported on the capabilities of the graduates of the two-year fire related education program in fire science offered at Cuyahoga Community College, and indicated the student is prepared to enter the areas of private protection, sales and service, insurance ratings, or fire investigation.

Another problem related to the restricting of enrollment in the fire related education program to members of fire departments, is the

---

[20]Albert Antonio, "Apprentice Fireman Program," Fire Engineering, CXXIII, 9, (September, 1970), p. 42.

closed inbreeding type of educational class situations created by this practice. A by-product to the restricted enrollment situation is the creation of restricted sections in the general academic courses required in the fire related education program, with placement in these sections restricted to the students majoring in the fire related education program. A significant portion of the essential development and learning so desirable in an academic education is a by-product of the class sessions, and a heterogeneous class creates one of the most desirable learning situations. Thus, the fire related education program students should not be isolated in special restricted sections of the required academic courses. Generally the fire service students are already too isolated in the fire stations.

B. Incentives for Education Program Participation

The two-year fire related education programs in the community colleges were usually initiated with the support, and at the request of fire department personnel. Thus, many fire departments have established financial incentives, which reward the individual with increased salary benefits for the attainment of college credits, a certificate, or a degree. The Upland, California, (122) Fire Department has reported an incentive pay program which awards an additional five or ten per cent of the base salary based upon a combination of fire department service and educational credit. The five per cent level of salary incentive may be attained with a combination of educational units and fire department service from 30 units of fire science courses and 5 years of fire department service to an Associate of Science Degree

with 30 units of fire science courses, and 2 years of fire department service. The next level of salary incentive of 7.5 per cent is awarded for a range of 45 units of fire science courses and 8 years of fire department service to a baccalaureate degree with 45 units of fire science courses and 2 years of fire department service. The third level of salary incentive is awarded for a range from 90 educational units, 60 of which are in fire science, with 12 years of fire department service to a Masters Degree with 60 units of fire science and 4 years of fire department service. A unique feature of the Uplands, incentive plan is the added requirement, for continued retention of the salary incentive the personnel must complete an additional three educational units each year.

Comer, Gallo, and Cusack, (32) in their article describing the fire related education programs in seven community colleges in New Jersey, reported the following information relative to incentive programs in Cranford, Clifton, and Patterson Fire Departments. The Town of Cranford pays a bonus for college credits, and college degree attainment, with a partial payment of the registration and tuition costs of approximately eighty per cent. The City of Clifton pays up to $1,320 for a total of 66 college credits at the incentive rate of $20 per credit. However, probably more importantly, the City of Clifton has indicated that personnel seeking promotion to the rank of Captain should have at least two years of college, and all the personnel seeking promotion to the chief officer ranks should possess a baccalaureate degree. The City of Patterson, New Jersey is reported to provide an incentive of

$22.50 in the regular salary of each member of the fire department for each credit hour earned toward a degree in fire science. However, this incentive compensation is limited to a maximum of $2,500 in any single calendar year. The members of the Patterson Fire Department are also reimbursed for the purchase price of their textbooks, thus, with the completion of the course, the book becomes the property of the city.

Oberg, (90) has indicated there are a variety of education incentive programs being utilized by fire departments, with the granting of increased compensation for the successful completion of courses being one of the most popular and universally adopted programs. However, he indicated another incentive which is rapidly being implemented and which has far greater implications is the initiation of a requirement for the attainment of a two-year fire related degree for promotion to the company officer ranks, usually a lieutenant or captain, and a baccalaureate degree for promotion to the chief officer rank.

Favreau, (42) reported in 1969 salary incentive plans based on educational attainment were established in both Madison, Wisconsin, and Dallas, Texas.

It would appear there has been a general trend toward the awarding of financial incentives and promotional opportunity incentives to the fire department personnel for their attainment of the fire related academic courses, and the fire related education degrees of both the two-year and the four-year types.

C. College Credit for Experience

The question of the granting of academic credit for fire department experience is a critical problem for the fire related education programs in the colleges and universities since some programs grant academic credit for the fire department experience and some do not grant experience credit. Stewart, (116) has indicated his belief that academic college credit for work experience will retard the progress of the members of the fire service toward professionalism in the following manner:[21]

> For many years educators have been experimenting with new or modified methods of teaching. Concurrently, they are demonstrating a relatively new philosophy on evaluating and certifying knowledge. For example, many colleges now allow students who pass a proficiency test to receive credit for a course without ever attending classes or fulfilling any other requirements. Some educators grant formal education credits for work experience. This is a good idea if used in conjunction with vocational education programs, and also is valid for some formal educational programs, such as those involving medical interns in a hospital.
>
> Programs like these allow an individual to utilize his intelligence or experience to supplement his formal educational program. Such programs should not, however, become total substitutes for formal education, which offers benefits that cannot be obtained just by taking a test. Typical advantages include the acquisition of good study habits, the ability to research information, and the learning of concise, effective methods of written and verbal communication.
>
> If we in the fire service allow our college curricula to become adulterated with programs that allow full college credit for work experience, then we surely will retard society's acceptance of ours as a true profession.

Maguire, (71) has indicated the two-year fire related education

---

[21] Terrance E. Stewart, "How Much Credit for Experience?" Fire Command, XXIII, 5, (May, 1976), p. 19.

program at Seattle Community College accepts and allows up to thirty-five college credits for experience and the rank attained on the fire department. However, considerations relative to the granting of college credit for experience are both philosophical and practical. Concerning the philosophical, when academic college credit is granted for experience, the assumption is then explicit, the college learning experience as experienced in the classroom and in the laboratory is the same experience as the work experiences of the fire fighter or the officer in the fire department. Any fire department member who has experienced both situations will agree they are not equivalent and similar experiences. The college course related learning experiences are not supposed to be similar, and the college fire related education program that provides an educational process with similar learning experiences to the fire department work experience is not conducting an educational program, but a vocational training program regardless of the academic credit granted or the degree awarded. It should not be assumed that work experience is not a necessary and valuable ingredient, that experience in emergency situations is not an essential component of the fire department technician or officer. It is a necessary and valuable learning component, but it is not the identical or equivalent component in learning or performance as the learning experience in the academic course situation. The student benefits from both experience situations, and the student should be an improved fire department member if he acquires more of the learning experiences in both the fire department or the fire scene environment, and in the academic course environment.

It is most interesting to note, the opposing view of many fire

department personnel relative to the equivalency of college academic credit for fire department work experience when the concept of dual entry for fire department officers is considered, or when college credits or degrees are considered as prerequisities for promotional opportunity. If the fire department work experience is to be considered equivalent for academic college credit, why is it that fire departments have not accepted the academic college credits as being equivalent to the fire department work experience relative to the in service seniority requirements for promotion in the fire departments? It would appear the fire department personnel themselves, who have experienced both the academic and work environments recognized the values and the limitations of both of the learning environments. For an institution to grant academic college credit for fire department duty or work experience is an indication of the general problem of the validity and essence of some of the fire related education programs.

The practical aspect of the problem relative to the granting of academic credit for the fire department duty or work experience involves the problem of assessing the learning and development in the individual as a result of the experience. How is the experience to be evaluated? By the number of responses? By the number of extended duty or working fires? By the responsibilities of the individual? The National Fire Protection Association, (87) has reported many fire department personnel spend approximately 5 to 20 per cent of their duty time engaged in emergency operations. The question then becomes, how do you evaluate the fire department duty experience relative to the time on duty which often involves housekeeping and maintenance procedures.

The question of granting academic credit for experience is really not a valid problem. Every college or university has a standard established academic procedure which enables a student to apply and arrange to take an examination over the subject area covered in a given course, and if the examination is passed, receive academic credit for the course. Obviously, this procedure is not utilized to a great extent at most institutions, because the student must demonstrate the attainment of the equivalent learning experience to the academic experience for which the academic credit has been requested. In principle, the student again earns the credit, the student is not granted the credit, the student earns the credit through the demonstration of proficiency in the academic subject area on the examination. Thus, when the question of academic credit for experience is debated, it is really a question of the granting of academic credit for fire department experience, without a demonstration of the attainment and the equivalency of the learning from the experience, as measured on an examination for the academic subject area of the fire related education program in the college or university.

Thus, it is difficult to understand the educational practice or methodology which grants academic college credit for fire department or any other fire service related experience without a demonstrated evaluation of the learning accomplished during the experience. The procedure of granting academic credit for experience can not be defended by philosophical or empirical considerations, and is actually an indication of the quality of the fire related education program and

the integrity of the faculty of the college or university conducting the program.

D. Quality of the Faculty

The two most important and essential components of any fire related education program are the students and the faculty. Given an interested, and inquiring student body and a dedicated faculty concerned with teaching, the application of research, unique concepts, and a sincere interest in the development of their students, the academic courses will constitute a valid program. Thus, the faculty is an essential component and probably the most important component to the development of a high quality, valid educational program.

There is evidence in the published and unpublished literature to indicate some of the fire related education programs have student problems due to questions concerning the proper qualifications for the faculty in the program. One of the primary areas of controversy relates around the need for the faculty to have actually fire department experience. White, (125) indicated his belief the primary consideration should be the academic qualifications of the faculty member in the following manner:[22]

> A general illusion is that only an instructor firmly based in the fire service can impart anything of value to fire service students. While I agree with this most certainly in training situations, I do not agree with it in an educational setting. Non-fire service treaching faculty can bring a fresh viewpoint to the classroom. They are not hung up on the old traditions, and rules of the fire service, which do presently exist. They

---

[22]Thomas White, "State-of-the-Art of Fire Related Higher Education in the United States," NAFSA News, IV, 4, (Fall, 1976) p. 11.

> will be more inclined to propose some new concepts, rather than to pass on the old tried and true methods, and that is what education is all about. They will be able to do this only because they look at the problems from a different viewpoint and a different frame of reference.

White's views on the type and quality of the faculty are unique for an individual with a fire service background. White indicated the generally accepted opinion of the fire department students in the fire related college education programs at some institutions indicates the instructor should have many years of service in the fire department. Owen, (94) indicated this generally prevalent attitude with the following statement:[23]

> You cannot have instructors who do not have fireground experience. In many areas such as tactics, advanced hydraulics, and arson investigation, the instructors need many years of experience to be effective teachers and be able to answer the questions that may have been raised by a 15-year fire captain.

Tarkowski, (119) has indicated he believes many of the fire related education programs lack "academic integrity", and one of the problems with some of the programs involved the lack of qualified college level faculty. Tarkowski indicated the ideal instructor for a two-year fire related education program in a community college is an individual with a baccalaureate degree and many years of experience in the fire service. Again, Tarkowski indicated what has been recognized by many students in the fire related education programs, a good drill-master or training officer from a fire department is not necessarily a good college level instructor.

---

[23]Willis Owen, "A Practitioner Looks at Fire Service Education Needs," Region 10 Fire Service Education Needs Analysis Seminar. Washington, D.C.: National Fire Prevention and Control Administration, December, 1976, p. 49.

Pynes, (104) indicated he believed experience is the most important ingredient for the instructor in a two-year fire related education program of fire technology. Pynes indicated retired fire chiefs, assistant fire chiefs, and battalion fire chiefs with courses in teaching methods to provide them with the educational methodology should provide the best possible faculty. However, it is interesting to note that Pynes also indicated the future goals of the fire service should be for every fire fighter to have an associate degree, and to require a bachelors degree for company officers, with a masters degree recommended for battalion chiefs, assistant chiefs, and chiefs of the department.

It would appear the preference for faculty with academic education or fire service experience will vary with the standards of the academic educational institution, and the availability of personnel. Obviously, the ideal faculty member should have qualifications and experience from both the fire department and academic environment. It would appear, education programs to increase the academic qualifications of the faculty are most essential and critical.

E. Uniformity of Programs and Courses

The issue of the uniformity of the course content, and the standardization of the course curriculum in the fire related education programs in the colleges and universities is of concern to many individuals, and presently appears to be of particular concern with the two-year programs in the community colleges. However, as the two-year community college programs are converted into four-year programs, and articulated four-year programs are developed this problem of the

uniformity of courses will also be of concern with the four-year programs.

The Wingspread Conference, (126) in 1966 recommended the establishment of specific minimum standards of training and competence for entrance into the profession, and especially at the officer levels. The following individuals in various publications have emphasized the need for a uniform curriculum in the two-year fire related education programs: Tarkowski, (119) has indicated the transferability of credits between programs in adjacent community colleges would be facilitated with a "standardized" program. Pynes, (104) has indicated there is a definite need for more uniformity in the educational programs, and the most effective procedure would be to provide guides for the development of these programs in the community colleges. Pynes, has indicated this need in the following manner:[24]

> A set of standard fire science, fire technology and fire administration curricula must be developed to provide guidelines for technical institutes and junior colleges to follow in developing associate degree programs.

It should be remembered that O'Keefe, (97) reported that Massachusetts had adopted a standard statewide curriculum for the two-year fire related education programs in 1972, as was previously mentioned in Section IV of this report. Swank, (117) indicated in 1967, that a uniform fire science curriculum had been developed for the programs in the California Community Colleges.

Favreau, (42) in 1969 developed in the publication by the American Association of Junior Colleges a recommended curriculum for a fire science

---

[24] Winfred G. Pynes, "Fire Service Education - A Need," Fire Command, XXXVII, 9, (September, 1970), p. 24.

associate degree program, and a fire science certificate program. Favreau, also included sample course descriptions for the recommended fire science courses.

The Alaska delegation of fire service personnel attending the Region 10 Fire Service Education - Needs Analysis Seminar (92) in 1976, formulated several conclusions relative to their concern for the uniformity of the courses and programs in the following manner:[25]

1. State fire science programs should be as uniform as practical. The concept could be applied to at least the regional level as well. Such uniformity would promote accreditation and transferability of credit in addition to articulation to more specialized degree programs.

3. Measures for uniformity should include standardizing course title, content and numbering where ever possible to accomodate counseling efforts.

5. College programs should be coordinated with the state noncredit fire instruction and such training as manual skills and vocational development should not be construed as college creditable.

The Idaho delegation of fire service personnel at the same regional conference on fire service education - needs analysis, (92) developed the following recommendations relative to the need for uniformity in the courses offered in the fire related education programs in the colleges and the universities:[26]

a. The institution of a two-year core program, which would be as consistent as possible with programs offered at all

---

[25]Oregon Fire Standards and Accreditation Board, Region 10 Fire Service Education - Needs Analysis Seminar. Washington, D.C. The National Academy for Fire Prevention and Control, Department of Commerce, December, 1976, p. 61-62.

[26]Ibid., p. 63-64.

other places in the region, or, if possible, in the nation. These programs would be flexible enough, however, to allow for special requirements of the immediate area, i.e. terrain, industrialization, etc.

b. Standards would be set for the sequence of courses (i.e. freshman and sophomore level courses), with general agreement as to the content of the offered courses (such as the content of chemistry or business courses).

d. A basic two-year core program could lead to an area emphasis in fire department administration, fire prevention or protection; and a successful and proven associate degree program could act as the foundation for a more specific baccalaureate degree program in these listed fields.

The lack of standardization in the four-year curricula, and the problems of course acceptability for transfer and entrance into the four-year programs was indicated by the Oregon delegation to the Region 10 Conference. (92)

White, (125) in his analysis and review of the Consortium report, (58) indicated the two-year fire related education programs had been established at 223 institutions with a total of 296 associate degree programs. White also indicated 117 programs granted an associate of arts degree, 84 programs awarded an associate of science degree, and 95 programs culminated in an associate of applied science degree. The specific program and degree titles consisted of some thirty variations in wordings and phraseology. However, beyond the differences in the classification of the degree and the titles of the programs, White found the content of the programs varied rather widely relative to the number of the fire specialized courses offered in the two-year fire related education programs as follows:[27]

In some college programs, as few as 20 percent of the courses for the degree in fire science were specialized. In other

---

[27] White, Op. Cit., p. 9.

> colleges, 75 percent of the courses required for the same degree were in specialized subjects. One program listed 30 separate fire related courses, most of them required. One can not help but feel that such a proliferation of courses indicates a serious diminishment in the subject matter.
>
> Very little coordination between the needs of the different ranks within the fire service and the level of education being offered was evident. Craftsman courses are being given to chief officers, while very few courses appear to approach the scope or level of the administrative and management information needed by the command officers.

The Consortium of fire service organizations represented in the Region 11 Fire Service Education Needs Analysis Project, (9) formulated the following recommendations to the National Academy for Fire Prevention and Control relative to the uniformity of programs:[28]

> A national model core-curriculum should be produced by the Academy and made available, free of charge, to colleges requesting it. This core would be the basis for certificate programs as well as degree programs.

Thus, it would appear evident there is a strong indication and support from many of the fire service persons involved with the two-year fire related education programs for a uniform or standard curriculum and courses. However, it should be noted the fire departments of the United States are organized and operated as paramilitary organizations primarily due to the emergency nature of their responsibilities and operations. Thus, fire department personnel as a result of their professional training and experience tend to favor a standardized and uniform preselected solution for a problem.

---

[28] Atlantic Community College, Region 11 Fire Service Education Needs Analysis Project, Final Report. Washington, D.C. National Academy for Fire Prevention and Control, Department of Commerce, May 31, 1976, p. 33.

Standardized procedures and evolutions enable the learning of the solution as a rote repetitive procedure which facilitates the duplication of the procedure under highly stressful emergency conditions, when the individual is usually suffering extreme physical discomfort.

It is not apparent that a uniform or standard curriculum with uniform course content would be the solution to all of the problems which are proposed for such a solution. It would seem many of the problems of articulation to four-year programs would not be solved, since the intrinsic differences in the quality of the courses would not be changed with uniform course titles, course descriptions, and course content. A uniform program is an attractive solution, but the effect may be primarily cosmetic, since a valid solution to the problems of articulation must involve the cooperative efforts of the administration and faculty of the affected institutions, and a system for the accreditation of the fire related education programs in the colleges and the universities.

Relative to this issue of uniform programs, articulation, and accreditation, Dr. Erickson, (39) in his report at the Region 10 Fire Service Needs Analysis Seminar, indicated the attitude of many educators, relative to the advantages of uniformity and standardization of courses and programs.

Erickson's statement reflects the difference of opinion with the fire service attitudes toward the standardization of courses in the

following manner:[29]

> Let me talk a little bit about accreditation, which I think must be faced sooner or later by this and other groups like it. When we talk of a common curriculum existing across the nation, this sounds like a very good idea. I think it might be just a little bit unrealistic. Colleges - both community colleges and four-year variety - are tremendously independent throughout their operation, and perhaps justifiably so. It is a little bit difficult to arrive at the "one true way" to prepare a fire administrator. Various schools have varying ideas. I would suggest that fire fighters might really want to look at the way other professionals deal with standards, and that is through the setting of minimal standards by a professional organization. In your instance, it might be the National Fire Academy, or it might be another professional group.

Apparently, there may be a basic and fundamental difference in the attitude of the educators and the fireservice personnel relative to the desirability of a uniform or standardized curriculum in the fire related education programs in the colleges and universities. This difference in attitude and opinion may be a reflection of the different environmental situations, and the professional experiences of the two populations. It would appear this differing attitude toward the uniformity of courses is very similar to the difference in attitude previously discussed in this section, relative to the provision of open enrollment in the fire related education programs or a program with the enrollment restricted to members of organized fire departments.

One of the basic concerns with a uniform or standardized curriculum with uniform course content is the lack of flexibility to accomodate

---

[29]James Erickson, "Higher Education, A View Toward Fire Protection and Education Needs," Region 10 Fire Service Needs Analysis Seminar, Washington, D.C., National Academy for Fire Prevention and Control, p. 58.

the differing capabilities of the various colleges and universities. These differences relate to faculty interest or qualifications, the characteristics of the student population, and the nature of the various fire problems which are unique to area or regional needs. Secondly, uniformity or standardization while it would establish an appearance of similarity, would still not achieve the basic fundamental concern of both students and educators. This concern involves the assurance that a given fire related education program in a college or university is equivalent to other programs, relative to the quality of the educational program. The most appropriate mechanism to determine the quality of an educational program is a valid accreditation procedure.

F. Articulation and Accreditation

Apparently, many of the fire service personnel presently participating in fire related education programs in colleges and universities, both as faculty and as students believe there is a definite need for a uniform or standard curriculum to be developed, with uniform or standardized courses. One of the advocated advantages of a uniform program with standardized courses has been to facilitate accreditation, and the articulation to the specialized courses in the four-year baccalaureate degree program. However, as was indicated previously, the concern for the uniformity of programs and courses has been extended by the fire service personnel to include some of the existing four-year programs.

The problem of articulation between two and four-year programs is related to accreditation primarily in an indirect manner. The transfer of credits between institutions and programs can be facilitated

and arranged to offer a minimum of disadvantages to the student, if the process is arranged cooperatively between the participating institutions. It is critical, the faculty, administrative officials, counselors, and other staff that will be involved in the mechanical aspect of the implementing the articulation agreements and procedures are involved in formulation of the procedure. Presently, numerous students are articulating from a two-year fire related education program to a four-year fire related education program, with neither program being accreditated. The students are not being penalized and the process operates effectively because the operations and procedures have been developed between the participating institutions.

Let us now examine the articulation procedures which have been developed for the Urban Studies - Fire Science baccalaureate degree program at the University of Maryland. This program requires the student to transfer into the University with a minimum of 60 academic credit hours from a two-year fire related education program in a community college. The student is not allowed to obtain these sixty credit hours at the University of Maryland. The student must articulate to the University of Maryland with 15 credit hours in the fire related specialization courses, 23 credit hours in the academic courses in the area of basic sciences and mathematics, and 22 credits of general university electives. The five coordinators from the two-year fire related education programs in the State of Maryland, with representatives from the Admissions Office, the Dean of Engineering office, and the departmental coordinator from the Fire Protection Curriculum comprise an advisory committee which established a coordinated understanding of the articulation procedures.

This formulation and implementation of the articulation process enables the community colleges to change their programs and arrange for the appropriate courses to be accepted prior to the student applying for transfer credit. Secondly, this preagreeded articulation procedure also enables the coordinators at both the community college and the University to counsel and advise the students more effectively during the appropriate preregistration period. It should be emphasized this type or articulation arrangement and procedure is not unique, it is utilized by educational institutions when there is an educational effort involving several institutions serving a related student population.

However, it is also obvious, there must be some basis for the concern of the fire department students relative to the process of articulation into a four-year fire related education program from a two-year program. This concern has probably been created by personal experiences in the articulation process where the student had courses that did not transfer into the four-year program. Remember, White, (125) identified some thirty different program titles, thus it would be surprising if all the credits of every student did transfer, due to the recognized large variety of courses and the academic problems with some of the fire related courses. One of the primary problem areas occurs when the student wishes to obtain articulation or transfer credit for courses in the two-year fire related program which the four year institutions consider of a vocational nature. This problem is created when the courses in question involve primarily physical skill and manipulative aspects of fire department operations. Obviously, most academic institutions conducting

a valid and comprehensive four year baccalaureate degree fire related education program would not allow such transfer credit. It has been recognized that some of the two-year fire related education programs have granted academic credit for the skill orientated, physical manipulative aspects of the fire department operations. (117) The recommendations of the Alaska delegation to the Region 10 seminar, (92) as previously quoted on page 86 of this report, indicated a concern that academic credit should not be granted for these vocational types of instructional training activities.

Another situation in which transfer and articulation problems would undoubtably occur, involves the student who received credit in the two-year fire related education program for his fire department experience, and the student then applies to transfer this credit into a four-year baccalaureate degree fire related education program. Undoubtably, many of the four-year fire related education programs will not accept experience granted credits as being valid academic credits earned at the two-year institution, and the credits would not then be allowable for articulation or transfer purposes.

However, it is difficult to understand how the proposed solution of a uniform program and standardized courses would solve these course articulation problems. These articulation problems appear to be problems which arise due to the differing perceptions of the faculty of the various institutions as to the quality of the courses and the programs in the institutions. This is the precise situation where the process of accreditation is essential and effective in establishing a minimum level of competence and quality for the academic program and courses. A valid accreditation procedure provides an evaluation process without a rigid uniform program which can not be adapted or modified to

the needs, advantages, or values of the faculty and the students in a particular educational institution.

When one examines the accreditation process and procedures followed by many of the professional organizations, it appears the accreditation process is conducted by a professional agency or an agency created for the accreditation procedure by the representative professional organizations. Erickson, (39) indicated the representative agency is the accreditation procedure followed by most professions, and the process he recommended to the fire service personnel attending the Region 10 Fire Service Needs Analysis Seminar, (92) in the following manner:[30]

> I'm suggesting to you that it is much better to have your own professional organization which will accredit the various offerings of four-year and two-year colleges than it would be to try and establish one common curriculum that will fit the whole world.

The Engineering profession has established the Engineer's Council for Professional Development as the accreditation agency for the engineering profession. The forty-second annual report of this organization, (38) indicated the council has fourteen participating professional organizations. It should be noted the curricula requirements for accreditation are stated and established as very broad and general requirements, leaving the development of the specific programs and courses to the administration, students, and the faculty through the appropriate advisory committees at the local institution.

An examination of the primary criteria for accreditation utilized by the Engineers' Council for Professional Development, (38) will

---

[30]Erickson, Op. Cit., p. 59.

give an indication of the items considered and the areas of concern considered essential to an evaluation of the suitability and quality of the educational program:[31]

1. The extent to which the program develops an ability to apply pertinent knowledge to the practice of engineering in an effective and professional manner. Included are the development of a capability to delineate and solve in a practical way the problems of society that are susceptible to engineering treatment, the development of sensitivity to the socially related technical problems which confront the profession, and the development of an ability to maintain professional competency through continued self study. These objectives are normally met by a curriculum in which there is a progression in the course work and in which fundamental scientific and other training of the earlier years is given application in the later engineering courses.

    a. For those institutions which elect to prepare graduates for entry into the profession at the basic level, ECPD normally will expect the curricula content of the program to include:

        1) The equivalent of approximately two and one-half years of study in the area of mathematics, science, and engineering. The course work should include at least one-half year of mathematics beyond trigonometry, plus one-half year of basic sciences, one year of engineering sciences, and one-half year of engineering design.

        2) The equivalent of one-half year as the minimum content in the area of the humanities and the social sciences.

2. The size and competence of the faculty; the standards and quality of instruction in the engineering departments and in the scientific and other operating departments in which engineering students receive instruction; and evidence of concern about improving the effectiveness of pedagogical techniques.

---

[31] Engineers' Council for Professional Development, Forty-Second Annual Report, Year Ending September 30, 1974. New York: p. 68-70.

3. The admission, retention, and scholastic work of students and the records of graduates both in further academic study and in professional practice.

4. The attitude and policy of the administration of the engineering division towards teaching, research, and scholarly production; the quality of leadership at all levels of administration of the division.

5. The commitment of the institutions, both financially and philosophically, to the program in engineering. This commitment may be evidenced by the relationship of the engineering unit to the institution as a whole, by the fiscal policy toward and the financial resources available to the engineering unit, and by the suitability of facilities including laboratories, libraries and computer facilities.

It should be realized the programs applying for accreditation complete a detailed questionnaire with the specific information relative to the credits assigned within the specified areas of mathematics, science, engineering sciences, engineering design, social sciences and the humanities. The accreditation procedure questionnaire requires information on the physical facilities of the program, the faculty, and the graduates. The institution visitation usually involves a team of seven to nine individuals, and usually takes approximately two days. An evaluator is assigned to each program, and rev ws student or graduate records, interviews students, examines course outlines, reviews teaching materials, and inspects laboratories and physical facilities. Before leaving the institution, the visitation team will present a formal verbal report to the chief executive officer of the institution in the presence of the engineering division executive officer, and the responsible faculty for the programs applying for accreditation.

The previously examined attitude of educational personnel toward

the standardization of programs and the uniformity of courses is shared by the Engineers' Council for Professional Development and is stated most explicitly as follows:[32]

> The functions of ECPD are restricted by its participating bodies to the granting of accreditation and the publication of a list of those programs that are approved. It has no authority to impose any restrictions or standardizations upon engineering colleges, nor does it desire to do so. On the contrary, it aims to preserve the independence of action of individual institutions and thereby to promote the general advancement of engineering education.

Thus, it can be assumed, the application of standardization to programs and courses is viewed by the Engineers' Council for Professional Development as a procedure resulting in restriction and limitation of engineering education.

Relative to the accreditation process, the visitation procedure as currently practiced by many of the professional organizations, involves a thorough and specific examination of all of the critical factors related to an education program, and is not limited to an examination of the curriculum and the specific stated course content and design. It should be remembered, the criteria of the Engineers Council for Professional Development, (38) considered the general areas of curriculum content; the competence of the faculty; the scholastic and professional attainments of students and graduates; the administration of the program and the institution; and finally the philosophical and financial support of the institution to the program. It should also be noted, accreditation visitation teams are primarily composed of

---

[32] Engineers' Council, Op. Cit. p. 72.

educational representatives, and industrial or governmental representatives of the professional organizations. Thus, the accreditation process is fundamentally based on the premise of peer evaluation and examination.

Marlowe, (74) has indicated there are various educational concepts and philosophies which are questioning the traditional methods of qualification for the professions. The burden of proof is now on each profession to indicate the selection procedure for admission to study, as well as its curriculum is necessary, valid, and open to all qualified applicants. Thus, as an example, it is necessary to demonstrate by a long term statistical study, the validity of the requirement for the one year of engineering science courses required in the Engineers' Council for Professional Development, (38) criteria as being essential for the performance of the specific engineering responsibilities of a given classification or type of engineer, including a fire protection engineer.

Thus, the validity of traditional certification procedures for professions are being examined, as the admission or enrollment procedures for the fire related education programs. Thus, accreditation procedures should also be open and subject to examination considering the validity of the accreditation criteria and procedural variables. Thus, does the accreditation procedure and the criteria truly evaluate the quality of the educational program and determine accurately the difference between a high quality and a low quality educational program. It is apparent the recent changes in our society are impacting on the fire related educational programs in the colleges and universities, as well as on the fire service as a profession.

G. Graduate and Student Opportunity

The problem of entry into fire departments is indirectly related to the problem previously discussed of restricted enrollment to the fire related education program, since some colleges are requiring membership in an organized fire department as a prerequisite for course enrollment. However, some fire departments due to legal challenges within the past few years, have now developed their mental and physical examinations to the specific requirements which have been validated as being required for the performance of the job or the position for which the individual is employed. (20) Fire departments have traditionally employed everyone as a fire fighter, and then developed their specialists, their technicians, their officers, and their executives from the initial entrance examination and specification. This traditional problem of personnel entrance and selection has now been clarified and identified as one of the principal problems retarding the advancement, progress, change, and innovation in fire departments. (30) (51) (102). Fistrom, (46) has indicated this "closed shop" operation of the fire service has discouraged the entrance of personnel with higher education credentials. Thus, the single entry type of personnel organization developed on a paramilitary system of operation in which everyone is initially selected to meet the requirements for a fire fighter, and then is expected to develop and mature into a specialist, technician, officer or executive, has been the motivational force for the development of the fire related education programs. The single entry situation is, of course, the creator of the closed promotion system problems of the fire department.

As was previously mentioned, the concept of a requirement for

specific academic credit and degree attainments relative to promotional opportunities for fire departments, first received national attention in the Wingspread report of 1966. (126) However, the recommended academic preparation of an associate degree for company officers and technicians, and a baccalaureate degree for all chief officers, has not been adopted by many fire departments. The Wingspread report also mentioned the need for increased professional mobility for fire officers, to facilitate the variety and varability of experience for the fire department officer. Valid professional mobility would also reduce the effect of the inbreeding that is fostered and developed with a single entry type of organization, featuring a closed promotion system. The Public Technology, Inc., (102) report on the means of achieving innovations in fire departments emphasized this need for mobility in fire department officers to increase the professionalism and the experience of fire department personnel as follows:[33]

> Such lateral mobility would have a beneficial effect on the morale of fire service personnel by allowing a greater range of job opportunities. At the officer level, it would increase cross-fertilization of ideas and it should facilitate the introduction of modern management concepts.

The National Fire Protection Association, (87) has indicated the current fire department procedures of single entry at the fire fighter level, and the internal closed promotion system is a practice condoned in very few occupations in the United States today. The National Fire Protection Association indicated these practices are the primary causes of inbreeding in the following manner:[34]

The present system whereby promotion and advancement in

---

[33] Public Technology Inc. A National Agenda for Programs to Increase the Introduction of Innovations in the Fire Service., 1973, p. 31.

[34] National Fire Protection Association, Op. Cit., p. 25.

> a fire department is confined to personnel already serving in that department inhibits development and creates an inbreeding which very often results in entrenchment and traditional adherence to established procedures whether sound or otherwise.

Thus, due to the established nature of the single entry system of the fire department, the paramilitary nature of the organization, with the closed promotion seniority - biased system, most fire departments effectively restrict their input of college and university graduates. The ambitious, intelligent younger fire department members, many with veterans administration educational benefits perceived the attainment of academic credits and academic degrees as a means for the acquisition of knowledge to improve their personal performance, and the performance or efficiency of the organization. However, graduates from the fire related education programs have often been frustrated since the fire departments have not adjusted to the educational and psychological changes in their personnel. The personnel management and promotional systems in the fire departments are still seniority - biased, and many of these persons are leaving the fire departments at the earliest retirement opportunities to enter the private enterprise and industry areas of fire protection where their academic attainment is recognized and valued. However, these are the personnel that should be retained in the fire departments to achieve the executive positions, where they may initiate modifications, and innovations in the structure of the organization. Ross, (107) has indicated this change in the attitude and the perceptions of the students in the fire related educational program at the Cuyahoga Community College in the following

manner:[35]

> We look forward to the time when civil service rules will include educational requirements for higher ranking officers similar to those presently in force in the European countries where the "two-tier" system of command is common. Our student will be ready for this also. And if the student wishes to apply his degree in the business world, he is at a distinct advantage in the fields of private fire protection, sales and service, insurance ratings, or fire investigation.

The lack of utilization of the knowledge and information which has been achieved by the student and graduate of the fire related education programs may have been one of the most critical mistakes in many fire departments. Oberg, (91) has indicated the question of: "how has your fire related degree changed your responsibilities in the department?" usually receives the response: "it hasn't." The Washington delegation to the Region 10 Fire Service Education - Needs Analysis Seminar, (92) indicated fire department officers and administrators did not attempt to utilize the newly developed capabilities of the college students and graduates. It was reported to be very frustrating for these individuals to watch other fire department personnel struggle with analysis procedures relative to the budget requirements, when the procedure could be accomplished by the college graduates more effectively in less time. Thus, it would appear the opportunities for the fire related education program student in the fire department are similar to the opportunities for the noncollege fire department personnel. This lack of professional endeavor and promotional opportunity based on knowledge and educational attainment is most frustrating to the college student graduate in many fire departments. A recent informal opinion survey conducted

---

[35]Charles Ross, Op. Cit. p. 17.

among the fire department personnel studying in the Urban Studies - Fire Science program at the University of Maryland, indicated the majority of the students were attaining their college education to obtain credentials in the fire protection areas utilized by insurance organizations and private industry.

Savas and Ginsburg, (109) have contrasted the civil service system of New York City with the Federal Civil Service. Savas and Ginsburg indicated the problems previously discussed of sirgle entry level and closed promotion procedures are characteristic of most civil service systems. They have also reported the favorable features of the federal civil service system and the disadvantages of this system in the following manner:[36]

> The federal system 1) makes far greater use of selective certification; 2) more readily accepts outside applicants for middle and upper positions, and evaluates them on the basis of their education and experience rather than by written examination; 3) bases promotions on performance rather than examination; 4) has a much shorter average time span for promotions; 5) identifies talented individuals early, at the time of the entrance examination; 6) encourages movement between government agencies; 7) is more concerned about training and identification of persons with higher potential; and 8) has a one year probationary period for new appointees, with positive action by supervisors necessary for retention.
>
> People who have served in both consider the federal system vastly superior to the one under which the city operates. However, some of the recommendations we have made would also apply to the federal government: 1) the need for evaluating duties and responsibilities of positions regularly to insure against demanding greater or different qualifications than the job requires; 2) strengthening the performance evaluation and potential assessment system; 3) doing away with automatic raises and tying them more closely to performance; and 4) making it easier to reward good performers and to demote or remove incompetent performers.

---

[36] E. S. Savas, and Sigmund G. Ginsburg, "The Civil Service: A Meritless System?" The Public Interest, (Summer, 1973), p. 81-82.

It would thus appear, the variables of the single entry and the seniority biased promotional system in the fire service, have resulted in the young, frustrated fire department personnel motivating the initiation of fire related education programs in many colleges and universities. Thus, these same personnel variables are now, also influencing these graduates to leave the fire departments at the earliest opportunity due to the lack of incentives and the opportunity to advance and utilize their capabilities in the improvement of the fire department. Thus, the lack of professional mobility in the fire service, even on an intrastate basis, is causing the very individuals the fire service needs, to leave the service at the earliest opportunity. It would seem that programs to achieve mobility within the profession would enhance the utilization of the educated fire department personnel and would also be a means of varying the experience and of providing additional experience environment learning situations for the fire department officer.

Through this review of the critical problem areas of the fire related education programs and the fire department personnel practices, the problem areas of personnel, educational programs, and the fire departments seem interrelated and interdependent. This is not really surprising since these problems are essentially people problems. The fire related education program in colleges and universities have created increased aspirations on the part of students and graduates in the fire departments.

VII. SUGGESTIONS AND RECOMMENDATIONS

These suggestions and recommendations are proposed for consideration and implementation by the National Academy for Fire Prevention and Control, relative to the tentative and continuing relationships with the colleges and universities conducting fire related education programs. These suggestions and recommendations are an attempt to present alternatives for the various objectives in the five year plan of the National Academy for Fire Prevention and Control, (83) and to provide concepts that may not have been explicitly defined in the planning process. The primary consideration in the evaluation and analysis of the existing relationships, and the proposed relationships between the National Academy for Fire Prevention and Control and the fire related programs in the colleges and universities has been the development of the most efficient procedure for the education of the various student populations and audiences within the fire protection environment. A supplemental consideration has been to attempt to identify the most critical and serious problems existing in the college and university fire related education programs at this time, and to suggest possible procedures for the modification of these problems in relation to the role of the National Academy for Fire Prevention and Control in the modification process.

These suggestions and recommendations are subjected to the limitations of this study as specified in Section II of this report. Most importantly, the suggestions and recommendations were formulated under the influence of the educational, psychological, social, and

professional experience biases of a single individual. It is also realized many of the variables or factors listed in the recommendations may already be under consideration for modification by the National Academy for Fire Prevention and Control.

The basic educational philosophy which has influenced the formation of these suggestions and recommendations has been very effectively paraphrased by Curtis as follows:[37]

> Education must be a form of training in virtue and not just a means of disseminating skills from the data of past experience. It is the education of persons that we are concerned about and not simply the complex conditioning of animal organisms.

It has also been recognized there appears to be a fundamental difference in attitude and the basic philosophies relative to the existing fire related education programs between the fire service orientated personnel, and the college and university orientated personnel. This difference appears to be most apparent in the concepts of the admission and enrollment policies for the programs, the essential qualifications of the faculty, and the need for the standardization of courses and programs.

The Five Year Plan drafts, (83) for the National Academy for Fire Prevention and Control were examined, and the objectives which appeared to have a direct relationship with the existing fire related education programs in the colleges and universities were selected for analysis. These Five Year Plan selected objectives were presented in Section V of this report. The Five Year Plan "objective results,"

---

[37]Huber Curtis, "Man, Morals and Mass Education," Phi Delta Kappan, XLVII, 7, (1966), p. 386.

are presented with the objectives which appear to be suitable for modification, with appropriate suggestions and recommendations:

A. Selected Five Year Plan Objectives

1. ACAD-5: This objective is expected to result in a report recommending the establishment of a mechanism for the accreditation of fire training and education programs.

It is recommended the accreditation procedure for fire training and education programs be established with the following principles: The concept of peer evaluation; General areas of curriculum subject requirements; The evaluation of faculty competence; The consideration of the physical facilities; and the administrative or financial support for the fire related education program within the institution. The accreditation procedure should require an on site evaluation, with provisions for the interviewing of faculty, administrators, students, and graduates of the fire related education program. A mandatory oral review of the preliminary findings of the visitation evaluation team with the institution officials should be established. Essentially, it is recommended an accreditation procedure be established which utilizes the tested and established procedures of the professional organizations, and which incorporates additional provisions which recognizes the unique aspects of the fire related education programs in the colleges and universities. The Engineers' Council for Professional Development, (38) accreditation criteria is suggested for preliminary study and modification.

The provision of the Academy for Educational Development Report, (2) which recommended the accreditation of individual programs at institutions

by the National Academy for Fire Prevention and Control is considered to be philosophically illogical , educationally indefensible. and professionally irresponsible.

2. ACAD-8: This objective provides for the dissemination of "Model" questions for use in fire service entrance and promotional examinations.

This objective in the Five Year Plan of the National Academy for Fire Prevention and Control, (83) appears to have a commendable objective, but the means to achieve this objective does not seem suitable. The provisions of "model" questions to provide "validated" examinations appears logically inconsistent, since an examination to be validated must be statistically evaluated as truly measuring the capability and knowledge required for the specific job, in a specific fire department, in a specific city or community. It is recommended, in place of the development of "model" questions or "model" examinations, the National Academy for Fire Prevention and Control develop an educational program consisting of regional seminars. These regional education seminars would be designed to provide the understanding,and to transfer to fire department and civil service officials the procedure for the development of a content valid examination as defined and developed by the United States Civil Service Commission in the study project with the District of Columbia Fire Department. (99)

3. ACAD-9: The determination of the optimal role for community colleges, colleges and universities in the fire service education and training process.

It is recommended the concept of the regional meetings with the concerned faculty, students, graduates, administrators and the fire service representatives be continued following the general design of

the Region 10 Fire Service Education - Needs Analysis Seminar, (92) until regional meetings have been held throughout the country. Following the study of the reports from all of the regional meetings, the National Academy for Fire Prevention and Control should organize the 1978 National Conference of the National Fire Prevention and Control Administration on the theme of, "Fire Related Academic Education and the National Academy." The conference should be structured as a productive seminar with working task groups to formulate recommended principles relative to the fire related education programs in the United States.

4. ACAD-17: The development and presentation of model courses in fire safety practices for architects, builders, interior designers, and urban planners.

The description of this program indicated the proposed development of three courses, one for practicing architects, one for architectural educators, and one for students of architecture. It is recommended the course for architectural educators be initiated first with the program designed for an intensive course of two or three days, to be presented regionally with joint sponsorship with the American Institute of Architects, and the state or local architectural societies.

The summer institute type of course offering as recommended by Nelson and Fitzgerald, (89) would appear to be functional for the educators. Thus, if the program for architectural educators is properly designed and presented, there would not be a need for a course for the architectural students. The course for the practicing architects should be developed as a self-paced programmed type of course, that could also be presented

in a two day seminar by the state and local architectural societies, coordinated through and with the assistance of the American Institute of Architects. The architectural educators who participated in the educators course, could be utilized as an initial audience for the pilot testing and evaluation of the practitioners course.

The practitioners course could be developed and designed as a seminar course as recommended by Bender, (16) and the American Institute of Architects. (5) This identical sequence of course development, if successful, could be utilized in cooperation with the professional organizations from the construction industry, the interior designers, and the urban planners.

5. ACAD-24: The provision of technical assistance concerning fire protection, education and training programs to vocational schools, community colleges, and universities.

The initiation of new, and the improvement of existing fire protection education programs is critically dependent upon the development of highly qualified and motivated faculty. The resources of the National Academy should be concentrated relative to this objective on programs designed to enable the academic development of existing personnel, and to provide highly qualified individuals for the future programs.

a. It is recommended, the National Academy for Fire Prevention and Control sponsor summer institutes at academic institutions in regional locations, to enable existing faculty and staff to improve their academic competency.

b. It is recommended, the National Academy for Fire Prevention and Control sponsor "National Fire Fellowships." These awards would consist of financial grants to academic institutions with fire related education

programs, to enable the utilization of selected graduate degree students in public administration, engineering, or urban studies as teaching assistants or research assistants in the fire related education program. There are presently a number of fire service students with baccalaureate degrees who are interested in graduate degrees. The "National Fire Fellowships" would provide a means of encouraging graduate study and enable the students to obtain teaching or research experience. The followships should provide high quality students with valid experience as faculty members.

6. ACAD-25: The implementation of a statewide fire protection education and training system by all of the states and territories.

7. ACAD-26: The implementation of comprehensive five year statewide fire education and training plans by the states and territories.

It is recommended, the National Academy for Fire Prevention and Control initiate procedures for the evaluation of the systems and the plans to assure that the components of the existing and planned fire related education programs in the colleges and universities in the various states and territories are afforded participation into the design of the system and the Five Year Plans.

8. ACAD-28: The establishment of a system of articulation agreements with colleges and universities.

a. The colleges or universities considered for articulation agreements should be institutions that have planned or existing fire related education programs in which a student may apply the academic credits toward an undergraduate or a graduate degree. The academic institutions participating in the extended college, open university, correspondence type of program recommended in ACAD-35, would be primary candidates for articulation agreements. The use of

these academic institutions would tend to eliminate problems for the students to utilize their academic credits toward a fire related education degree.

b. It should be recognized, the articulation agreements between the academic institutions and the National Academy for Fire Prevention and Control may specify and impose some procedures relative to course fees, prerequisite college credits in specific subjects, examination procedures, and the examination of specific course requirements, including term papers before credit will be awarded. It should be remembered, the faculty of any quality academic program will insist on the continuance of their fundamental philosophical principle, that credit for academic performance must be demonstrated by examination and earned.

9. ACAD-30: The provision of financial support to students attending fire education courses and nondegree training programs at colleges, universities, and community colleges.

a. The effectiveness of this objective in achieving definite results beyond an increase in the initial enrollment in nondegree programs is questioned. It is recommended the financial support be granted only for the successful completion of the course with the National Academy for Fire Prevention and Control establishing the criteria for successful completion and the payment of financial support. Relating the financial support to completion of the course should provide motivation for improved student performance throughout the course. In addition, the evaluation of students upon completion of the course, and the presentation of the course should also be improved, rather than the initial enrollment in the course.

b. Current experience indicated most states and localities, with high quality effective programs do not have an attendance problem. However, financial incentive programs for student enrollment might have a negative effect, by the creation of an enrollment beyond the capabilities of the faculty and the physical or financial resources of the programs in the colleges, universities or community colleges. It is recommended there be continued evaluation and study of the intent of this objective, and the results of the objective on most of the existing fire related education programs in colleges, universities, and community colleges.

10. ACAD-31: The provision of loans to individuals enrolled in University fire research-engineering programs.

a. Do not believe this objective will accomplish the expected result of an increased number of students enrolled in fire research or engineering programs. With the scholarships, grants, cooperative education and summer employment programs, financial aid does not appear to be a critical problem to the current fire protection engineering students. Fire research involves graduate study and graduate students usually obtain assistance through positions as graduate teaching or research assistants.

It should be remembered recommendation 5.b concerning ACAD-24, recommended grants to institutions to enable the utilization of graduate students as teaching and research assistants in fire related education programs through the "National Fire Fellowships".

b. It is recommended that an amortization be provided on the loans whereby a student would have twenty-five percent of the loan forgiven for each calendar year of service in a faculty position in a fire related

education program in a college or university. This provision would encourage fire protection engineering and fire research students to utilize the loans and then enter the faculty in the fire related education programs. This faculty service amortization would provide a source of young, highly qualified personnel, that could initiate innovations to improve the existing programs and make possible the initiation of new programs where the need had been recognized.

c. It is recommended this loan program with the faculty service amortization be extended to baccalaureate degree graduates of fire related programs who are continuing study for graduate degrees. The loan program would then supplement the "National Fire Fellowships".

d. It is recommended this loan program with faculty service amortization be extended to students in the junior and senior years of accreditated baccalaureate degree programs. This feature would provide additional faculty and also provide motivation for the accreditation of fire related education programs.

11. ACAD-35: The development and implementation of a correspondence course system for fire education and training.

The academic institutions participating in this program should be primary candidates for the articulation agreements in ACAD-28. This program has the potential to be one of the most important objectives of the National Academy for Fire Prevention and Control. It is recommended that many innovative education techniques be considered under this program including programmed texts, television instruction, (127) and the true extended campus, open university approach as applied to the fire service.

The case study learning techniques as developed by Flammer, (47) and Alic, (3) in engineering education would appear to be ideally suited to the open university situation. Layman, (68) demonstrated the superb application of the case study to the study of the mechanics of fire suppression in his text in 1952.

12. ACAD-36: The distribution of model curricula and related materials to fire education institutions.

The effectiveness of providing prepackaged and developed materials including model curricula or courses is questioned when the educational program involves the development of degree courses for academic credit. It is recommended to provide Fire Related Education Seminars where two or three day programs designed to impart information related to teaching techniques, resource materials, and to allow faculty to exchange concepts, ideas and techniques, would be more effective. Faculty, traditionally tend to resist the adoption of materials supplied by external organizations and agencies. The valid need is to develop the capability and motivation in the faculty to improve the education programs, and to provide the information on where to obtain the resources for the desired improvement. The traditional concern relative to uniform and standardized programs and courses would also inhibit the adoption and use of model curricula and courses.

VIII. CONCLUSIONS

The suggestions and recommendations in Section VII of this report were related directly to the Five Year Plan objectives of the National Academy for Fire Prevention and Control. (83) These conclusions contain

suggestions for the procedures and philosophy of the National Academy for Fire Prevention and Control to foster the development of an enduring cooperative relationship with the existing fire related education programs in the colleges and universities.

It will be apparent these conclusions have emphasized the formulation of programs for the improvement and development of the faculty in the fire related education programs in the colleges and universities. It is sincerely believed the current and future problems in the fire related education programs will be most effectively and efficiently solved with the development of a high quality, dedicated faculty commensurate to the faculty required in all of the recognized professions.

1. The following principal problems were identified in the existing fire related education programs in the colleges and universities during this study, and were examined in detail in Section VI of the report. It is recommended the policies and programs of the National Academy for Fire Prevention and Control be designed and directed toward the alleviation of these problems:

   a. Restricted or closed enrollment policies.
   b. Incentives for program participation.
   c. Academic credit for experience.
   d. Qualifications of faculty.
   e. Uniformity of programs and courses.
   f. Articulation and accreditation.
   g. Graduate and student opportunity.

2. To achieve recognition as a profession, graduate education must be established in the fire related education programs in the colleges and universities. Program areas have been identified, (46) and forest fire related graduate education programs have received both financial and personnel support. (81) (82) Graduate education provides the essential interchange and relationship between research innovation and the progression of the profession. (28) A valid appreciation and understanding of the purpose, process, and limitations of research is essential to the improvement of public fire protection.

It is recommended the National Academy for Fire Prevention and Control provide financial support for the initiation of graduate fire related education programs in conjunction and cooperation with the Fire Safety and Research Office of the National Fire Prevention and Control Administration. Graduate education is an essential process for the improvement and development of the existing and future faculty in the fire related education programs.

3. The National Academy for Fire Prevention and Control should establish an "Academy Associate" program. The program would be designed to encourage and facilitate the interchange of faculty personnel between colleges and universities with fire related education programs and the National Academy for Fire Prevention and Control.

a. Faculty from colleges and universities would serve as visiting instructors at the National Academy for Fire Prevention and Control on a one or two semester basis.

b. Instructional personnel from the National Academy for Fire Prevention and Control would serve as visiting professors in the fire related education program at the colleges or universities.

4. The National Academy for Fire Prevention and Control should initiate "Visiting Professor" positions in the fire related education programs at selected colleges and universities. These positions would enable the interchange of faculty between colleges and universities, with the resulting education and improvement of the faculty.

5. A "Sabbatical Facilitation" program should be established by the National Academy for Fire Prevention and Control with both financial and personnel support. Most community colleges provide little or no opportunity for sabbatical leave to the faculty of the fire related education programs. Personnel support could be provided through the "Visiting Professor" program, or with the use of graduate students under the "National Fire Fellowships", discussed relative to ACAD-24 on page 111 of this report. Faculty in fire related education programs would be considered eligible for this program with the following sabbatical goals:

a. Participation in the "Academy Associate" program.

b. Participation in the "Visiting Professor" program where mutual interchange of faculty can not be arranged. An example might be the initiation of new courses or a new program at an institution.

c. Participation in continued graduate study toward a graduate degree in a program designed to improve the professional capabilities of a faculty member in a fire related education program.

d. Participation in continued graduate study on a "National Fire Fellowship".

e. Participation as adjunct personnel to obtain professional experience designed to improve the professional capabilities of the faculty member in a fire related education program, including the following:

1. Fire research organization: Private or government fire research laboratories, including the Fire Research Center at the National Bureau of Standards, and the Fire Safety and Research Office of the National Fire Prevention and Control Administration.

2. Fire Prevention organization: State or local fire marshal or fire prevention bureau, including the Public Education Office at the National Fire Prevention and Control Administration.

3. Fire Department: Professionally staffed and administered fire department, including selected governmental agency or private industry departments.

6. An attitude of sincere commitment to cooperative endeavors and mutual professional respect must be developed between the National Academy for Fire Prevention and Control and the fire related education programs in the colleges and universities. The National Academy for Fire Prevention and Control will have to earn the respect of the academic faculty with the establishment and maintenance of high standards of performance in their programs in the following manner:

a. Established demonstrated performance in an academic fire related education program should be a prerequisite for attendance in the

residence courses at the National Academy for Fire Prevention and Control. Attendance or enrollment procedures established on the political considerations of rank, geographical area, and organizational memberships will reflect on the academic and professional integrity of the National Academy for Fire Prevention and Control.

b. Faculty of the National Academy for Fire Prevention and Control should be selected for demonstrated proficiency in academic performance including teaching, research, and professional competence. The present selection of personnel appears to indicate a strong bias toward the selection of fire department and fire service performance orientated individuals.

c. The established and respected procedures of academic integrity will have to be maintained in the National Academy for Fire Prevention and Control courses. The maintenance of these procedures is especially critical for the courses in which academic credit is to be obtained from colleges and universities through articulation agreements. Most critical in this respect will be the procedure adopted relative to the consideration of academic credit for experience.

d. The eventual evaluation of the quality, academic integrity, and the professional competence of the National Academy for Fire Prevention and Control courses and programs will be determined by the students and the graduates through their achievements and professional performance.

IX. BIBLIOGRAPHY

1. Abbott, James, "National Forest Fire Management Training Programs," A Seminar and Workshop, The Problems in Teaching the Fire Sciences. Silver Spring: The Johns Hopkins University, Applied Physics Laboratory, APL/JHU, FFPB 73-1, November, 1973, 38-55.

2. Academy for Educational Development, Inc. A Guide for Planning and Selecting the Site for the National Academy for Fire Prevention and Control. PB-248 092, Springfield, Va.: National Technical Information Service, November 15, 1975.

3. Alic, J. A., "Adding Guidance to Case Studies," Engineering Education, LXVII, 5 (February, 1977), 374-376.

4. Allen, David, William S. Bodner, Richard I. Lano and John M. Meyer, A Study of the Firemans Occupation. Bureau of Industrial Education, California State Department of Education and Division of Vocational Education, University of California, 1968.

5. American Institute of Architects Codes and Regulation Center, Educating the Architect: Fire and Life Safety, A Report of the AIA Task Group on Fire and Life Safety. Washington, D.C. American Institute of Architects.

6. Andrews, Robert L., A Report on Fire Safety Education and Training for Urban Planners, Architects, Interior Designers, and Builders. Washington, D.C. National Fire Prevention and Control Administration, August 28, 1975.

7. Antonio, Albert, "Apprentice Fireman Program", Fire Engineering, CXXIII, 9, (September, 1970), 42.

8. Architecture Planning Research Associates, The National Academy for Fire Prevention and Control, Environmental Impact Assessment, Washington, D.C. National Fire Prevention and Control Administration, September 7, 1976.

9. Atlantic Community College. International Society of Fire Service Instructors, and American Association of Community and Junior Colleges, Region II Fire Service Education Needs Analysis Project, Final Report. Washington, D.C. The National Academy for Fire Prevention and Control, National Fire Prevention and Control Administration, Department of Commerce, May 31, 1976.

10. Banks, Ronald D., A Preliminary Proposal for a Cooperative Community Fire-Fighting and Personnel Training Program at the University of Utah. Salt Lake City: Public Service Careers Program, October 28, 1971.

11. Barr, Robert, "Fire Department Administration," Proceedings of the Second Seminar and Workshop on the Teaching of the Fire Sciences. Silver Spring: The Johns Hopkins University, Applied Physics Laboratory, APL/JHU, FPPB 74-2, December, 1974-20-22.

12. Barrett, D.E., "Province of Ontario Programs," Proceedings of the Symposium on Higher Education for the Fire Service. Albany: Division of Fire Safety, State of New York, 1967, 134-144.

13. Bartholomew, Robert. "Interior Designers Should be Familiar with Fire Codes," Fire Engineering, CXXIX, 12, (December, 1976), 35.

14. Bell, Walter S., "Westchester Community College Program," Proceedings of the Symposium on Higher Education for the Fire Service. Albany: Division of Fire Safety, State of New York, 1967, 195-206.

15. Bender, Paul, "The Community College, A View Toward Fire Protection and Education Needs," Region 10 Fire Service Needs Analysis Seminar, Washington, D.C., National Fire Prevention and Control Administration, 54-56.

16. Bender, Richard, Fire and the Education of the Architect. Berkeley, N.F.P.C.A. Conference on Fire Safety Education and Training for Architects, Interior Designers and Builders, College of Environmental Design, University of California, January 26-28, 1976.

17. Bond, Horatio, Survey of Potential Demand for Fire Protection Engineers. Boston: Society of Fire Protection Engineers, September 27, 1960.

18. Borgelt, Larry, An Occupational Analysis of Education and Training Needs in Fire Protection. Stillwater: Department of Trade and Industrial Education, Oklahoma State University, May, 1966.

19. Breen, John P., "Advanced Tactics and Strategy", Proceedings of the Second Seminar and Workshop on the Teaching of the Fire Sciences. Silver Spring: The Johns Hopkins University, Applied Physics Laboratory, APL/JHU, FPP B74-2, December, 1974, 16-20.

20. Bryan, John L., Analysis of Employment Requirements for Open Entry and Entry Level Positions in the Fire Departments of the Washington, D.C. Metropolitan Area. Silver Spring: Fire Management Associates, June, 1971.

21. Bryan, John L., An Examination and Analysis of the Educational Programs Needed for the Development of Individuals Oreintated to the Solution of Fire Problems. College Park: Fire Protection Curriculum, University of Maryland, Presented to the National Commission on Fire Prevention and Control, February 16, 1972.

22. Bryan, John L., "Maryland Programs," Proceedings of the Symposium on Higher Education for the Fire Service. Albany: Division of Fire Safety, State of New York, 1967, 90-112.

23. Burkett, J. E. and Paul G. Ruggiers, Bachelor of Liberal Studies. Boston: Center for the Study of Liberal Education for Adults, Boston University, 1965.

24. Byrus, Robert C., Report of Fire Science Type Programs as Conducted by Community Colleges in Florida. Tallahassee: Department of Community Affairs, State of Florida, Fire Fighters Standards Council, March, 1972.

25. Carroll, Joseph J., "How Can We Develop Courses of Study," A Seminar and Workshop, The Problems in Teaching the Fire Sciences. Silver Spring: The Johns Hopkins University, Applied Physics Laboratory, APL/JHU, FPP B73-1, November, 1973, 99-102.

26. Carroll, Joseph J. and Sylvan P. Stern, "Community College, City of New York Program," Proceedings of the Symposium on Higher Education for the Fire Service, Albany: Division of Fire Safety, State of New York, 1967, 228-244.

27. Casey, James F., "F.P. Engineers Needed," Fire Engineering, CXXIII, 8, (August, 1970), 25.

28. Christian, William J., "The Fire Protection Engineer and the Technology Explosion," Fire Technology, IV, 4, (November, 1968), 319-322.

29. Clark, William E., "Wisconsin Programs," Proceedings of the Symposium on Higher Education for the Fire Service. Albany: Division of Fire Safety, State of New York, 1967, 114-134.

30. Clark, William E., Donald F. Favreau, Anthony R. Granito, David B. Gratz, Keith E. Klinger, Donald M. O'Brien, John T. O'Hagan, Keith Roger, Lester R. Schick, and Henry D. Smith, "The 1970's - The Challenging Years for the Fire Service," Fire Engineering, CXX, 9, (September, 1967), 106-120.

31. Cline, James, "N.J. High School Seminars Prepare For Fire Service," Fire Engineering, CXXIC, 9, (September, 1976), 80.

32. Comer, William J., James Gallo, and William E. Cusack, "College Program in New Jersey," Fire Engineering, CXXVII, 5, (May, 1974), 51.

33. Corn, Michael B., "Youths Train, Work on Fireground to Explore Fire Fighting Career," Fire Engineering, CXXIX, 4, (April, 1976), 31.

34. Curtis, Huber, "Man, Morals and Mass Education," Phi Delta Kappan, XLVII, 6, 1966, 386.

35. Diezel, Harry E., "Educational Integration: Recruit Training and Off-Campus College Courses," Fire Command, XXXIX, 12, (December, 1972), 14-15.

36. Division of Fire Safety, State of New York, Proceedings of the Symposium on Higher Education for the Fire Service. Albany: Office for Local Government, State of New York, 1967.

37. Egan, M. David, Fire Protection and Life Safety, Clemson: College of Architecture, Clemson University, 1975.

38. Engineers Council for Professional Development, Forty-Second Annual Report, Year Ending September 30, 1974. New York: Engineers Council for Professional Development, 1974.

39. Erickson, James, "Higher Education, A View Toward Fire Protection and Education Needs," Region 10 Fire Service Needs Analysis Seminar. Washington, D.C., National Fire Prevention and Control Administration, 57-59.

40. Evans, James R., "An Administrator Looks at Fire Service Education Needs," Region 10 Fire Service Needs Analysis Seminar. Washington, D.C.: National Fire Prevention and Control Administration, December, 1976, 50-53.

41. Everard, William H., "F.P.E. Offers Broader Viewpoint to Fire Service as a Staff Aide," Fire Engineering, CXXIII, 8, (August, 1976), 37-38.

42. Favreau, Donald F., Guidelines for Fire Service Education Programs in Community and Junior Colleges. Washington, D.C., American Association of Junior Colleges, 1969.

43. Favreau, Donald F., Fire Science Technology Curricula Survey. Albany: International Fire Administration Institute, State University of New York at Albany, November, 1966.

44. Favreau, Donald F., Higher Education in the Nation's Fire Service. Albany: International Fire Administration Institute, State University of New York at Albany, February, 1968.

45. Favreau, Donald F., Fire Service Education, 1971, A Survey and Historical Developments of Fire Service Education in the United States. Albany: International Fire Administration Institute, State University of New York at Albany, June, 1971.

46. Fistrom, R. M. Topical Report Comments on Problems in Fire Service Education I. A National Fire Service Academy II. An Idealized Master's Degree Program in Fire Engineering. Silver Spring: The Johns Hopkins University, Applied Physics Laboratory, APL/JHU FPP TR19, November, 1974.

47. Flammer, Gordon H., "The Case Study: Exercise in Simulation," Engineering Education, LXVII, 5 (February, 1977), 372-373.

48. Fottrell, Eugene J., "Fire Service Training at the College Level," Fire Command, XXXVII, 8, (August, 1970), 23-24.

49. Frank, David M., "What Educational Standards Exist or Should be Developed for Fire Service Curricula," A Seminar and Workshop, The Problem in Teaching the Fire Sciences. Silver Spring: The Johns Hopkins University, Applied Physics Laboratory, APL/JHU, FPP B73-1, November, 1973, 55-56.

50. Froyier, David R., "British Fire College is Geared to Practical Teaching of Skills," Fire Engineering, CXXIX, 2, (February, 1976), 32-33.

51. Frohman, Alan, Marc Schulman and Edward Roberts, Factors Affecting Innovation in the Fire Services. Washington, D.C.: Center for Fire Research, Fire Services Section, National Bureau of Standards, Contract 1-35905, March, 1972, 127-130.

52. Gallo, Robert and William Maywalt, "Auburn Community College Program," Proceedings of the Symposium on Higher Education for the Fire Service, Albany: Division of Fire Safety, State of New York, 1967, 181-194.

53. Garyales, Rudolph J. in A Seminar and Workshop. The Problems in Teaching the Fire Sciences. Silver Spring: The Johns Hopkins University, Applied Physics Laboratory, APL/JHU, FPP B73-1, November, 1973, 122-123.

54. Gilman, Edward, "High School Course Taught by On-Duty Fire Fighters," Fire Engineering, CXXX, 1, (January, 1977), 141.

55. Grimes, Martin, "An Overview of Teaching and Training Objectives," A Seminar and Workshop, The Problems in Teaching the Fire Sciences. Silver Spring: The Johns Hopkins University, Applied Physics Laboratory, APL/JHU, FFPB73-1, November, 1973, 5-14.

56. Hanbury, William J., "Fire Detection and Protection Systems," Proceedings of the Second Seminar and Workshop on the Teaching of the Fire Sciences. Silver Spring: The Johns Hopkins University, Applied Physics Laboratory, APL/JHU FPPB74-2, December, 1974, 22-23, 59-67.

57. Holbrook, Donald, "Higher Education Programs," Proceedings of the Symposium on Higher Education for the Fire Service. Albany: Division of Fire Safety, State of New York, 1967, 25-40.

58. International Association of Fire Chiefs, The International Association of Fire Fighters, The International Society of Fire Service Instructors, The National Fire Protection Association, Report on a Survey of the Fire Education and Training Programs. Washington, D.C.: National Fire Prevention and Control Administration, December 3, 1975.

59. Jayne, Elliott W., "The Fire Science Student and Graduate," A Seminar and Workshop. The Problems in Teaching the Fire Sciences. Silver Spring: The Johns Hopkins University, Applied Physics Laboratory, APL/JHU, FPPB73-1, November, 1973, 148-419.

60. Jensen, Rolf H., "Illinois Programs," Proceedings of the Symposium on Higher Education for the Fire Service. Albany: Division of Fire Safety, State of New York, 1967, 41-57.

61. Jensen, Rolf, "Does Industry Want Fire Protection Engineers?" Fire Journal, LXII, 6, (November, 1968), 41-43.

62. Jensen, Rolf, "Fire Protection Engineering: Career Opportunities in the Seventies," Fire Journal, LXVII, 1, (January, 1973), 25-27.

63. Joint Council of National Fire Service Organization, Williamsburg 70: National Goals of the Fire Service. Boston: National Fire Protection Association, 1970.

64. Kohrmann, Robert F., Jr., "Higher Education and the Fire Service," Fire Command, XXXVII, 8, (August, 1970), 22-23.

65. Kimball, Warren Y., "The Trend in Higher Education for the Fire Service," Firemen, XXXVI, 12, (December, 1969), 14-17.

66. Klansit, Frederick in A Seminar and Workshop, The Problems in Teaching the Fire Sciences. Silver Spring: The Johns Hopkins University, Applied Physics Laboratory, APL/JHU, FPPB73-1, November, 1973, 104-106.

67. Koenig, Peter, "They Just Changed the Rules on How to Get Ahead," Psychology Today, (June, 1974), 87-103.

68. Layman, Lloyd, Attacking and Extinguishing Interior Fires. Boston: National Fire Protection Association, 1952.

69. Lisack, J. P., Fire Fighters in Indiana, Standards, Training, and Certification, Vol. 1, W. Lafayette: School of Technology, Purdue University, Manpower Report 74-2, July 15, 1974.

70. Lucht, David A., Education for the Fire Marshal - A National Perspective. Washington, D.C., National Fire Prevention and Control Administration, November 16, 1976.

71. Maguire, High D., "Seattle's Fire Command and Administration Program," Fire Command, XL, 1, (January, 1973), 24-26.

72. Markgraf, William, A Degree Completion Program for Fire Fighters. Columbia: Columbia College, 1975.

73. Marks, Leonard G., "Voluntary National Professional Certification Examinations," Fire Command, XXXVIII, 7, (July, 1971), 24.

74. Marlowe, Donald E., "The Perils Ahead for Certification," Engineering Education, LXVII, 5, (February, 1977), 336.

75. Martin, Richard, Brian Joiner, Scott Johnson, Warren Lombay, Cynthia Gauminty, and Jessie Gwynue, Preliminary Report - Statistical Analysis of the "Survey of the Fire Education and Training Program Within the United States and Its Territorial Possessions," Madison: Statistical Laboratory, Department of Statistics, November 29, 1976.

76. Mathews, Thomas James, The Urban Fire Station: A Sociological Analysis of an Occupation. Pullman: Department of Sociology, State College of Washington, 1950.

77. Miller, Dennis C., "The Fire Science Student and Graduate," A Seminar and Workshop. The Problems in Teaching the Fire Sciences. Silver Spring: The Johns Hopkins University, Applied Physics Laboratory, APL/JHU, FPPB73-1, November, 1973, 152-155.

78. Minnesota State Advisory Council on Fire Service Education and Research, Report No. 2, Training/Education. Minneapolis: Fire Service Information Research and Education Center, University of Minnesota, September 15, 1972.

79. Morris, Gary P., "Quality Training at New British Fire College," Fire Command, XXXVII, 12, (December, 1970), 20-23.

80. Munson, Michael J., Integrated Planning for Fire Control with the General Urban Planning Process, Berkeley: N.F.P.C.A. Conference on Fire Safety Education and Training for Architects, Interior Designers, and Builders, College of Environmental Design, University of California, January 26-28, 1976.

81. Murphy, James L., Graduate Programs in Forest Fire Science and Technology, Seattle: College of Forest Resources, University of Washington, 1969.

82. Murphy, James L., Forest Fire Sciences Graduate Studies, Vancouver: Western Forest Fire Coordinating Committee, December 1, 1970.

83. National Academy for Fire Prevention and Control, Five Year Plan Drafts, Education and Training, Washington, D.C.: Fire Prevention and Control Administration, Department of Commerce, November, 1976.

84. National Commission on Fire Prevention and Control, America Burning. Washington, D.C.: Government Printing Office, 1973.

85. National Fire Prevention and Control Administration, Report of the National Academy for Fire Prevention and Control Site Selection Board. Washington, D.C.: Department of Commerce, 1976.

86. National Fire Protection Association, "Education, Which Way for the Fire Service?" Fireman, XXXIV, 12, (December, 1967), 28-29.

87. National Fire Protection Association, The Public Fire Services Some of the Problems, Some Suggestions. Boston: National Fire Protection Association, 1972.

88. National Fire Protection Association, The Fire Problem, Boston: N.F.P.A. National Commission on Fire Prevention and Control, February 15, 1972.

89. Nelson, Harold E. and Robert W. Fitzgerald, The Development of Fire Safety Design Skills in the Building Designer , Berkeley: N.F.P.C.A. Conference on Fire Safety Education and Training for Architects, Interior Designers, and Builders, College of Environmental Design, University of California, January 26-28, 1976.

90. Oberg, Frank E., "What Directions for Fire Service College Programs in the 70's", Fire Command, XXXVII, 8, (August, 1970), 24-25.

91. Oberg, Frank E., "The Future of Fire Service Education and Training," Fire Command, XXXVIII, 6, (June, 1971), 16-18.

92. Oregon Fire Standards and Accreditation Board, Region 10 Fire Service Education - Needs Analysis Seminar. Washington, D.C. The National Academy for Fire Prevention and Control, National Fire Prevention and Control Administration, Department of Commerce, December, 1976.

93. Ostrander, Charles, "Hudson Valley Community College Program," Proceedings of the Symposium on Higher Education for the Fire Service. Albany: Division of Fire Safety, State of New York, 1967, 206-215.

94. Owen, Willis, "A Practitioner Looks at Fire Service Education Needs," Region 10 Fire Service Education Needs Analysis Seminar. Washington, D.C.: National Fire Prevention and Control Administration, December, 1976, 47-49.

95. O'Hagan, John T., "Fire Science Courses for the Professional Fireman," WNYF, XXX, 2, (1969), 18-19.

96. O'Keefe, Joseph A. and Robert T. Carlson, "Innovative Teaching Methods," Proceedings of the Second Seminar and Workshop on the Teaching of the Fire Sciences. Silver Spring: The Johns Hopkins University, Applied Physics Laboratory, JHU/APL FPPB74-2, December, 1974, 50-57.

97. O'Keefe, Joseph A., "What's Ahead in Fire Science Degree Programs?" Fire Command, XXXIX, 12, (December, 1972), 20-21.

98. Parsons, Wilfrid L., "The Fire Service Looks at the Problem," Proceedings of the Symposium on Higher Education for the Fire Service. Albany: Division of Fire Safety, State of New York, 1967, 9-13.

99. Payne, Sandra S., Guide to the Development of Written Job-Knowledge Promotion Tests for Fire Fighters. Washington, D.C.: U.S. Civil Service Commission, Personnel Research and Development Center, June, 1976.

100. Proper, George H., Jr., "The State Government Looks at the Problem," Proceedings of the Symposium on Higher Education for the Fire Service. Albany: Division of Fire Safety, State of New York, 1967, 4-8.

101. Public Law 93-498, Federal Fire Prevention and Control Act of 1974, Washington, D.C. 93rd Congress, S.1769, October 29, 1974.

102. Public Technology, Inc. A National Agenda for Programs to Increase the Introduction of Innovations in the Fire Service. Washington, D.C. Center for Fire Research, National Bureau of Standards, Contract 2-36051, November 6, 1973.

103. Purington, Robert G., "Hydraulics," Proceedings of the Second Seminar and Workshop on the Teaching of the Fire Sciences. Silver Spring: The Johns Hopkins University, Applied Physics Laboratory, APL/JHU, FPP B74-2, December, 1974, 14-16.

104. Pynes, G. Winifred, "Fire Service Education - A Need," Fire Command, XXXVII, 9, (September, 1970), 24.

105. Rapp, Marvin, "The College Looks at the Problem," Proceedings of the Symposium on Higher Education for the Fire Service. Albany: Division of Fire Safety, State of New York, 1967, 13-24.

106. Rasbash, David, "Edinburgh University's First Two Years," Fire, LXVIII, 845, (November, 1975), 297-298, 301.

107. Ross, Charles, "Education at Cuyohoga Community College," Fire Command, XXXIX, 12, (December, 1972), 16-17.

108. Sartain, Gaylord L., "Oklahoma Programs," Proceedings of the Symposium on Higher Education for the Fire Service. Albany: Division of Fire Safety, State of New York, 1967, 58-69.

109. Savas, E. S. and Sigmund G. Ginsburg, "The Civil Service: A Meritless System?" The Public Interest, (Summer, 1973), 70-85.

110. Shields, Donald C. "Fire Fighter's Self Image, Projected Image, and Public Image," Fire Command, LXI, 11, (November, 1974), 26-27.

111. Silva, Elmer J., "Building Construction," Proceedings of the Second Seminar and Workshop on the Teaching of the Fire Sciences. Silver Spring: The Johns Hopkins University, Applied Physics Laboratory, JHU/APL FPP B74-2, December, 1974, 23-26.

112. Smith, Henry D., "Texas Programs," Proceedings of the Symposium on Higher Education for the Fire Service. Albany: Division of Fire Safety, State of New York, 1967, 70-89.

113. Society of Fire Protection Engineers, Committee Report - Committee on Society Qualifications, Boston, S.F.P.E., March 2, 1976.

114. Stearns, S. Russell, ES-21 Introduction to Engineering, Fire Protection and Control: Residential Communities. Hanover: Dartmouth College, November 21, 1967.

115. Stern, Sylvan P., "Articulation with Four-Year Courses," Proceedings of the Second Seminar and Workshop on the Teaching of the Fire Sciences. Silver Spring: The Johns Hopkins University, Applied Physics Laboratory, JHU/APL, FPP B74-2, December, 1974, 46-50.

116. Stewart, Terrance E., "How Much Credit for Experience?" Fire Command, XLIII, 5, (May, 1976), p. 19.

117. Swank, Roy, "California Programs," Proceedings of the Symposium on Higher Education for the Fire Service. Albany: Division of Fire Safety, State of New York, 1967, 144-165.

118. Sylvia, Dick, "Firemen Will Feel Academy Impact on Education," Fire Engineering, CXXIX, 8, (August, 1976), 44-45.

119. Tarkowski, Arthur J., "Let's Strive for Quality College Programs," Fire Command, XXXIX, 12, (December, 1972), 13.

120. Tuve, R. L. (ed.), A Seminar and Workshop - The Problems in Teaching the Fire Sciences. Silver Spring: Applied Physics Laboratory, The Johns Hopkins University, APL/JHU, FPP B73-1, November, 1973.

121. Tuve, R. L. (ed.), Proceedings of the Second Seminar and Workshop on the Teaching of the Fire Sciences. Silver Spring: Applied Physics Laboratory, The Johns Hopkins University, APL/JHU, FPP B74-2, December, 1974.

122. Upland Fire Department,"Incentive Pay Plan for Education in Upland, California, F.D." Fire Engineering, CXXVII, 4, (April, 1974), 69.

123. Verburg, Darell, "High School Fire Science Course," Fire Engineering, CXXVII, 12, (December, 1974), 40-41.

124. Vespers, K. H., Engineers at Work: A Casebook, Boston, Houghton Mifflin Company 1975.

125. White, Thomas, "State-of-the-Art of Fire Related Higher Education in the United States," NAFSA News, IV, 4, (Fall, 1976), 6-12.

126. Wingspread Conference on Fire Service Administration, Education and Research, Statements of National Significance to the Fire Problem in the United States. Racine: The Johnson Foundation, 1966.

127. Wise, Myrle K. "Utilizing TV in The Modern Fire Department," Fire Command, XLII, 8, (August, 1975), 28-31.

128. Wynn, John M., "Fire Science Studies Growing in Alabama, " Fire Engineering, CXXIV, 10, (October, 1971), 46.

129. Young, Roger, John Davies, Doil Felts, and Alexander Tazzarino, A Guide to Independent Study Through Correspondence Instruction. Washington, D.C.: National University Extension Association, 1970.

130. Zuccarelli, Louis A. "The Community College Fire Science Graduate - What is His Future in the Fire Service?" Fire Command, XLII, 1, (January, 1975), 20 & 25.

131. Zuccarelli, Louis A. and John Lee Cook, Jr., "Recent Innovations in Fire Science Training," Fire Command, XLII, 12, (December, 1975), 22-23.

☆ U.S. GOVERNMENT PRINTING OFFICE : 1977—240-548/229